Immunization Update

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Kansas Immunization Conference 2013

Disclosures

- Speakers are KDHE employees with no financial interest or conflict with the manufacturer of any product named in this presentation
- The speakers will discuss the off-label use of HPV, influenza, Tdap, pneumococcal conjugate, and meningococcal vaccines
- The speakers will not discuss a vaccine not currently licensed by the FDA

Disclosures

ACIP Meeting
Oct 23-24, 2013

www.cdc.gov/vaccines/recs/acip/

- The recommendations to be discussed are primarily those of the Advisory Committee on Immunization Practices (ACIP)
  - composed of 15 non-government experts in clinical medicine and public health
  - provides guidance on use of vaccines and other biologic products to DHHS, CDC, and the U.S. Public Health Service

Outline

Part 1

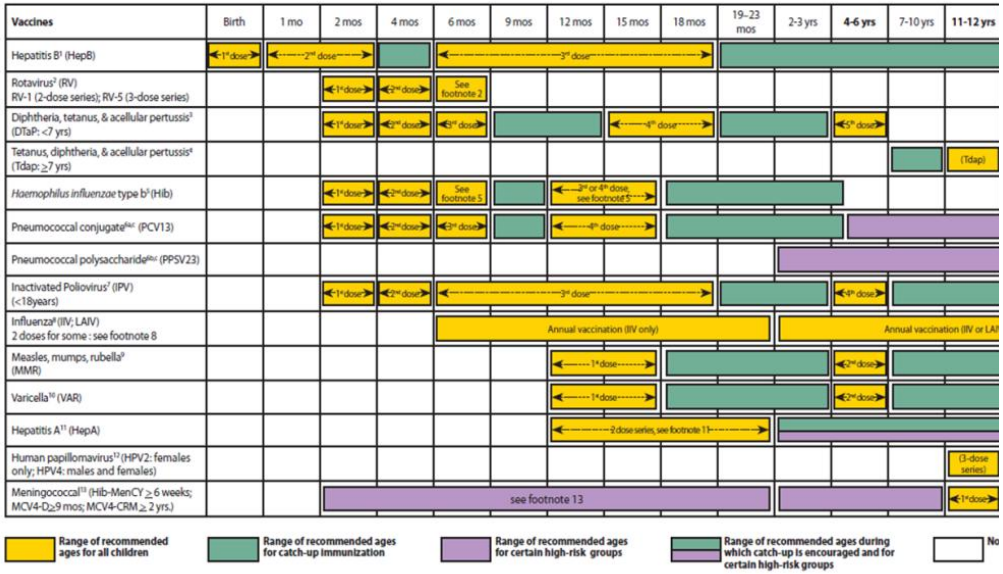
- Immunization Schedules
- Immunization Coverage Rates
- HPV Vaccine
- Pertussis Vaccines
- Pneumococcal Vaccines
- Meningococcal Vaccines
- MMR Vaccine
- Influenza Vaccines
- Zoster Vaccine

Part 2

- Communication Strategies
- Vaccine Storage and Handling
- Vaccine Administration
- Questions

Figure 1. Recommended immunization schedule for persons aged 0 through 18 years – 2013.
(FOR THOSE WHO FALL BEHIND OR START LATE, SEE THE CATCH-UP SCHEDULE [FIGURE 2]).

These recommendations must be read with the footnotes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars in Figure 1. To dete intervals between doses, see the catch-up schedule (Figure 2). School entry and adolescent vaccine age groups are in bold.



This schedule includes recommendations in effect as of January 1, 2013. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasi bination vaccine generally is preferred over separate injections of its equivalent component vaccines. Vaccination providers should consult the relevant Advisory Committee on Immunization Practic for detailed recommendations, available online at http://www.cdc.gov/vaccines/pubs/acip-list.htm. Clinically significant adverse events that follow vaccination should be reported to the Vaccine Adv System (VAERS) online (http://www.vaers.hhs.gov) or by telephone (800-822-7967).Suspected cases of vaccine-preventable diseases should be reported to the state or local health department. Addit including precautions and contraindications for vaccination, is available from CDC online (http://www.cdc.gov/vaccines) or by telephone (800-CDC-INFO [800-232-4636]).

This schedule is approved by the Advisory Committee on Immunization Practices (http://www.cdc.gov/vaccines/acip/index.html), the American Academy of Pediatrics (http://www.aap.org), the Ame Family Physicians (http://www.aafp.org), and the American College of Obstetricians and Gynecologists (http://www.acog.org).

NOTE: The above recommendations must be read along with the footnotes of this schedule.

FIGURE 2. Catch-up immunization schedule for persons aged 4 months through 18 years who start late or who are more than 1 month behind —United States • 2013

The figure below provides catch-up schedules and minimum intervals between doses for children whose vaccinations have been delayed. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Use the section appropriate for the child's age. Always use this table in conjunction with Figure 1 and the footnotes that follow.

Persons aged 4 months through 6 years

Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses			
		Dose 1 to dose 2	Dose 2 to dose 3	Dose 3 to dose 4	Dose 4 to dose 5
Hepatitis B[1]	Birth	4 weeks	8 weeks and at least 16 weeks after first dose; minimum age for the final dose is 24 weeks		
Rotavirus[2]	6 weeks	4 weeks	4 weeks[2]		
Diphtheria, tetanus, pertussis[3]	6 weeks	4 weeks	4 weeks	6 months	6 months[4]
Haemophilus influenzae type b[5]	6 weeks	4 weeks if first dose administered at younger than age 12 months 8 weeks (as final dose) if first dose administered at age 12–14 months No further doses needed if first dose administered at age 15 months or older	4 weeks[6] if current age is younger than 12 months 8 weeks (as final dose)[6] if current age is 12 months or older and first dose administered at younger than age 12 months and second dose administered at younger than 15 months No further doses needed if previous dose administered at age 15 months or older	8 weeks (as final dose) This dose only necessary for children aged 12 through 59 months who received 3 doses before age 12 months	
Pneumococcal[6]	6 weeks	4 weeks if first dose administered at younger than age 12 months 8 weeks (as final dose for healthy children) if first dose administered at age 12 months or older or current age 24 through 59 months No further doses needed for healthy children if first dose administered at age 24 months or older	4 weeks if current age is younger than 12 months 8 weeks (as final dose for healthy children) if current age is 12 months or older No further doses needed for healthy children if previous dose administered at age 24 months or older	8 weeks (as final dose) This dose only necessary for children aged 12 through 59 months who received 3 doses before age 12 months or for children at high risk who received 3 doses at any age	
Inactivated poliovirus[7]	6 weeks	4 weeks	4 weeks	6 months[4] minimum age 4 years for final dose	
Meningococcal[13]	6 weeks	8 weeks[14]	see footnote 13	see footnote 13	
Measles, mumps, rubella[9]	12 months	4 weeks			
Varicella[10]	12 months	3 months			
Hepatitis A[11]	12 months	6 months			

Persons aged 7 through 18 years

Tetanus, diphtheria; tetanus, diphtheria, pertussis[4]	7 years[4]	4 weeks	4 weeks if first dose administered at younger than age 12 months 6 months if first dose administered at 12 months or older	6 months if first dose administered at younger than age 12 months	
Human papillomavirus[12]	9 years	Routine dosing intervals are recommended[12]			
Hepatitis A[11]	12 months	6 months			
Hepatitis B[1]	Birth	4 weeks	8 weeks (and at least 16 weeks after first dose)		
Inactivated poliovirus[7]	6 weeks	4 weeks	4 weeks[7]	6 months[4]	
Meningococcal[13]	6 weeks	8 weeks[14]			
Measles, mumps, rubella[9]	12 months	4 weeks			
Varicella[10]	12 months	3 months if person is younger than age 13 years 4 weeks if person is aged 13 years or older			

http://www.cdc.gov/vaccines/schedules/hcp/child-adolescent.html

http://www.cdc.gov/vaccines/schedules/hcp/imz/catchup.html

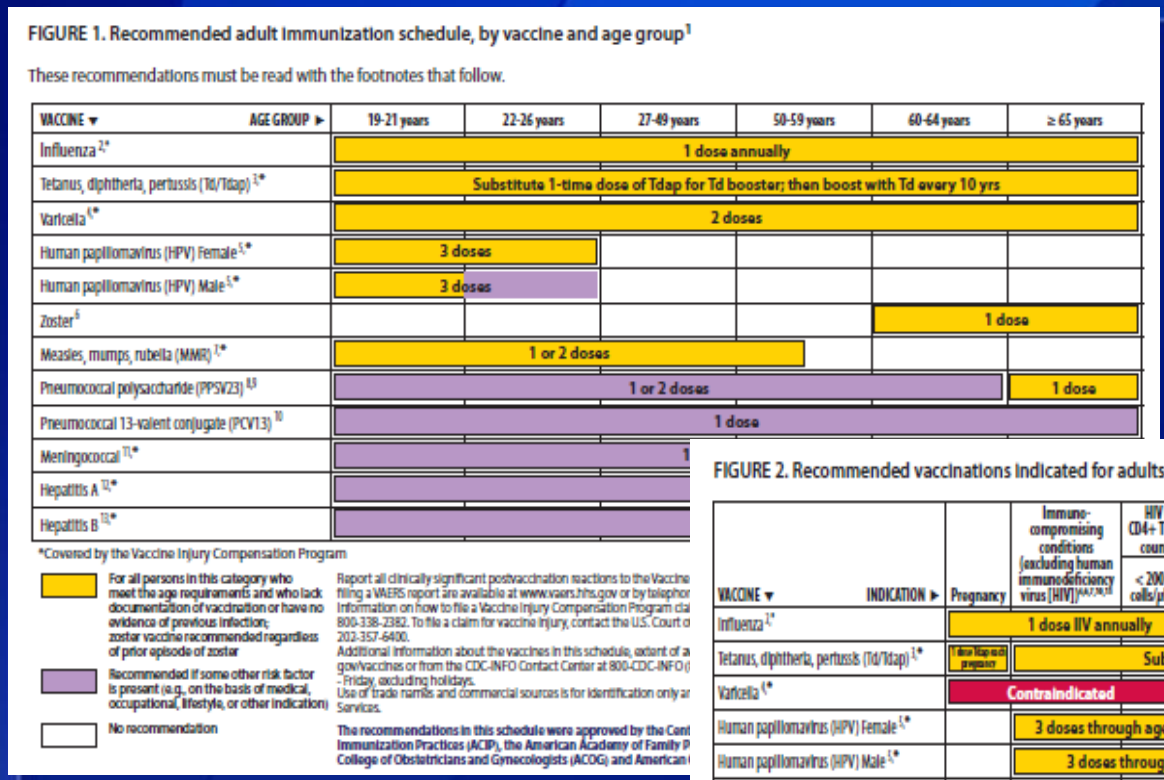


FIGURE 1. Recommended adult immunization schedule, by vaccine and age group[1]

These recommendations must be read with the footnotes that follow.

VACCINE ▼ AGE GROUP ►	19-21 years	22-26 years	27-49 years	50-59 years	60-64 years	≥ 65 years
Influenza[2,*]	1 dose annually					
Tetanus, diphtheria, pertussis (Td/Tdap)[3,*]	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs					
Varicella[4,*]	2 doses					
Human papillomavirus (HPV) Female[5,*]	3 doses					
Human papillomavirus (HPV) Male[5,*]	3 doses					
Zoster[6]					1 dose	
Measles, mumps, rubella (MMR)[7,*]	1 or 2 doses					
Pneumococcal polysaccharide (PPSV23)[8,9]	1 or 2 doses					1 dose
Pneumococcal 13-valent conjugate (PCV13)[10]	1 dose					
Meningococcal[11,*]	1					
Hepatitis A[12,*]						
Hepatitis B[13,*]						

*Covered by the Vaccine Injury Compensation Program

For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection; zoster vaccine recommended regardless of prior episode of zoster

Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indication)

No recommendation

Report all clinically significant postvaccination reactions to the Vaccine
filing a VAERS report are available at www.vaers.hhs.gov or by telephon
Information on how to file a Vaccine Injury Compensation Program cla
800-338-2382. To file a claim for vaccine injury, contact the U.S. Court o
202-357-6400.
Additional information about the vaccines in this schedule, extent of a
gov/vaccines or from the CDC-INFO Contact Center at 800-CDC-INFO (
- Friday, excluding holidays.
Use of trade names and commercial sources is for identification only a
Services.

The recommendations in this schedule were approved by the Cent
Immunization Practices (ACIP), the American Academy of Family P
College of Obstetricians and Gynecologists (ACOG) and American

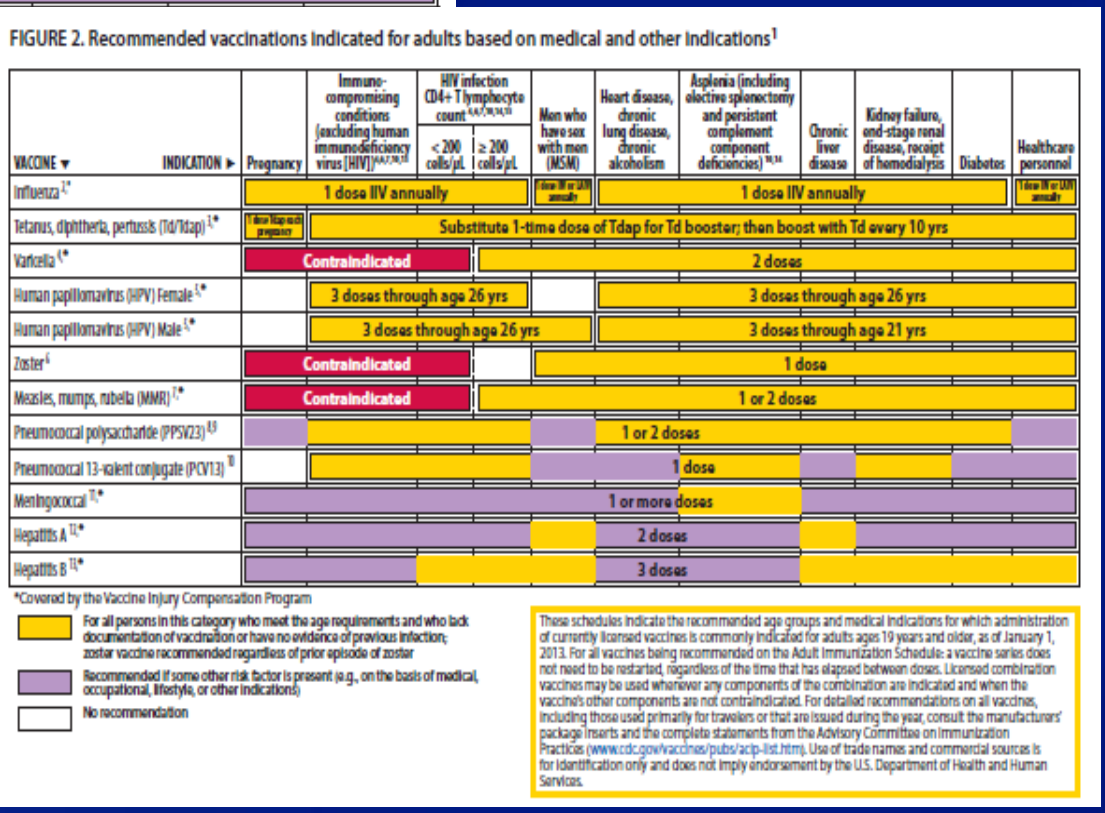


FIGURE 2. Recommended vaccinations indicated for adults based on medical and other indications[1]

VACCINE ▼ INDICATION ►	Pregnancy	Immuno-compromising conditions (excluding human immunodeficiency virus [HIV])[4,6,7,10,13]	HIV infection CD4+ T lymphocyte count[4,6,7,10,13,15] < 200 cells/μL	HIV infection CD4+ T lymphocyte count[4,6,7,10,13,15] ≥ 200 cells/μL	Men who have sex with men (MSM)	Heart disease, chronic lung disease, chronic alcoholism	Asplenia (including elective splenectomy and persistent complement component deficiencies)[10,14]	Chronic liver disease	Kidney failure, end-stage renal disease, receipt of hemodialysis	Diabetes	Healthcare personnel
Influenza[2,*]	1 dose IIV annually				1 dose IIV or LAIV annually	1 dose IIV annually					1 dose IIV or LAIV annually
Tetanus, diphtheria, pertussis (Td/Tdap)[3,*]	1 dose Tdap each pregnancy	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs									
Varicella[4,*]	Contraindicated			2 doses							
Human papillomavirus (HPV) Female[5,*]		3 doses through age 26 yrs				3 doses through age 26 yrs					
Human papillomavirus (HPV) Male[5,*]		3 doses through age 26 yrs				3 doses through age 21 yrs					
Zoster[6]	Contraindicated			1 dose							
Measles, mumps, rubella (MMR)[7,*]	Contraindicated			1 or 2 doses							
Pneumococcal polysaccharide (PPSV23)[8,9]		1 or 2 doses									
Pneumococcal 13-valent conjugate (PCV13)[10]		1 dose									
Meningococcal[11,*]	1 or more doses										
Hepatitis A[12,*]	2 doses										
Hepatitis B[13,*]	3 doses										

*Covered by the Vaccine Injury Compensation Program

For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection; zoster vaccine recommended regardless of prior episode of zoster

Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)

No recommendation

These schedules indicate the recommended age groups and medical indications for which administration of currently licensed vaccines is commonly indicated for adults ages 19 years and older, as of January 1, 2013. For all vaccines being recommended on the Adult Immunization Schedule: a vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Licensed combination vaccines may be used whenever any components of the combination are indicated and when the vaccine's other components are not contraindicated. For detailed recommendations on all vaccines, including those used primarily for travelers or that are issued during the year, consult the manufacturers' package inserts and the complete statements from the Advisory Committee on Immunization Practices (www.cdc.gov/vaccines/pubs/acip-list.htm). Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

http://www.cdc.gov/vaccines/schedules/hcp/adult.html

Showing the CDC Schedules on Your Website

http://www.cdc.gov/vaccines/schedules/syndicate.html

IMMUNIZATION COVERAGE RATES

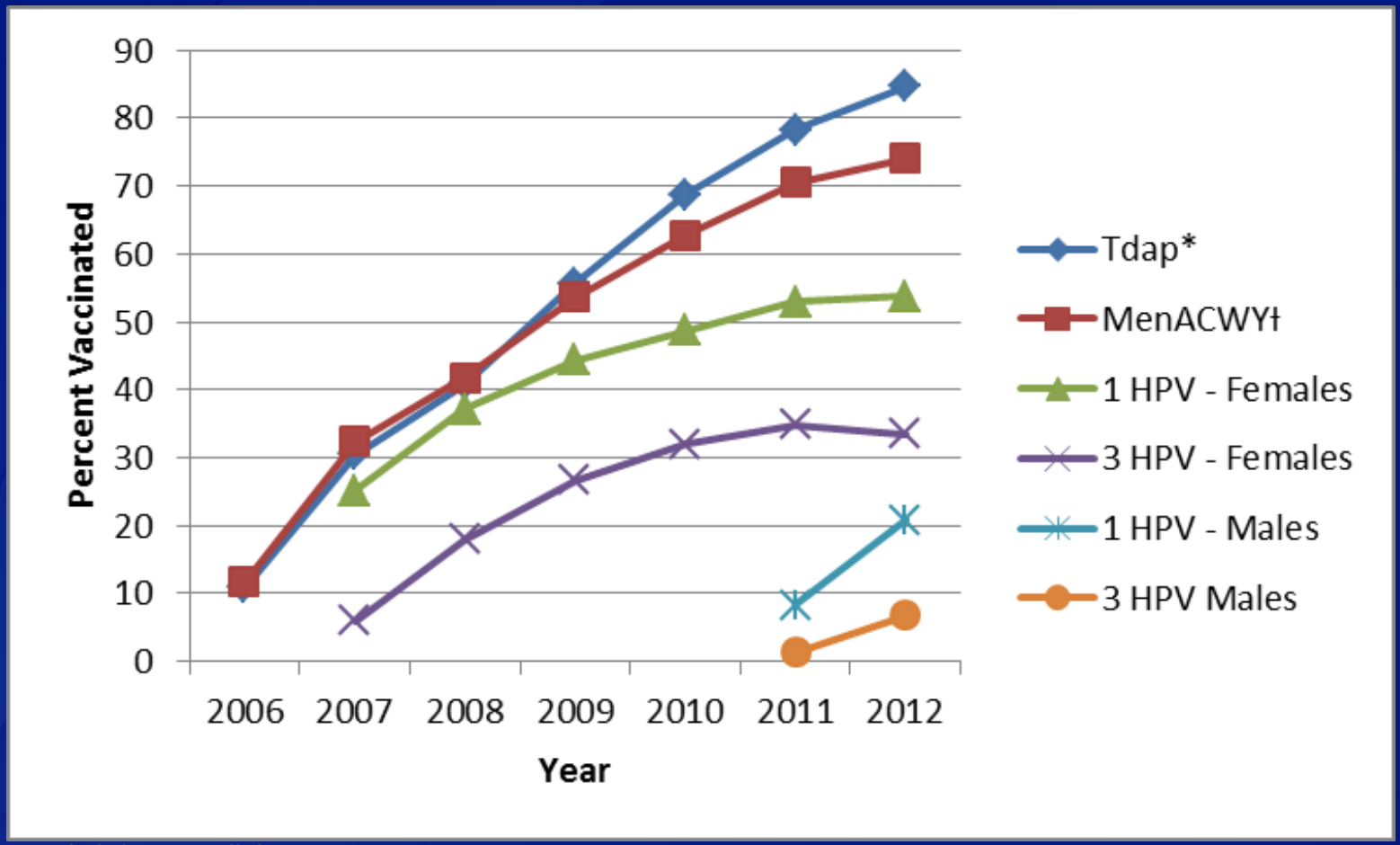
Estimated Coverage of Vaccines Among Children Aged 19-35 Months, NIS, U.S., 2012

State/Area	Vaccine Series* 4:3:1:3:3:1:4
United States	68..4%
Kansas	65.0%

*Includes ≥4 doses DTaP/DT/DTP, ≥ 3 doses polio, ≥ 1 dose MMR, full series of Hib, ≥ 3 doses Hep B, ≥ 1 varicella, and ≥ 4 PCV.

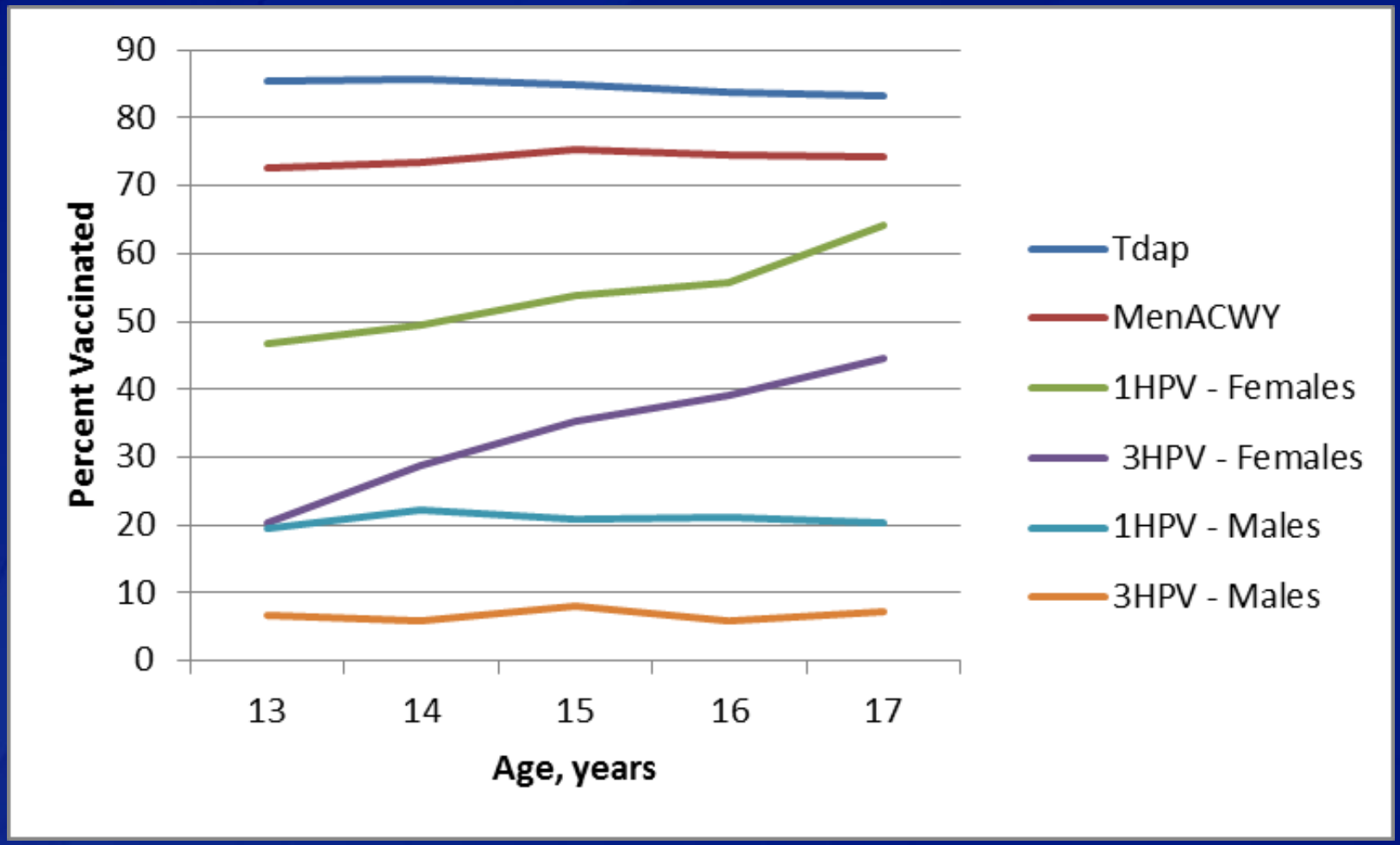
MMWR 2013; 62(36): 733-740

National Estimated Vaccination Coverage Levels among Adolescents 13-17 Years, National Immunization Survey-Teen, 2006-2012



Tdap: tetanus, diphtheria, acellular pertussis vaccine.
MCV4: meningococcal conjugate vaccine
HPV: human papillomavirus vaccine

Tdap, MenACWY, and HPV Vaccination Estimates by age for adolescents 13 - 17, NIS-Teen, 2012



Vaccination Coverage for Target Groups by Vaccine, Age, and High-Risk Status, NHIS 2010* and 2011

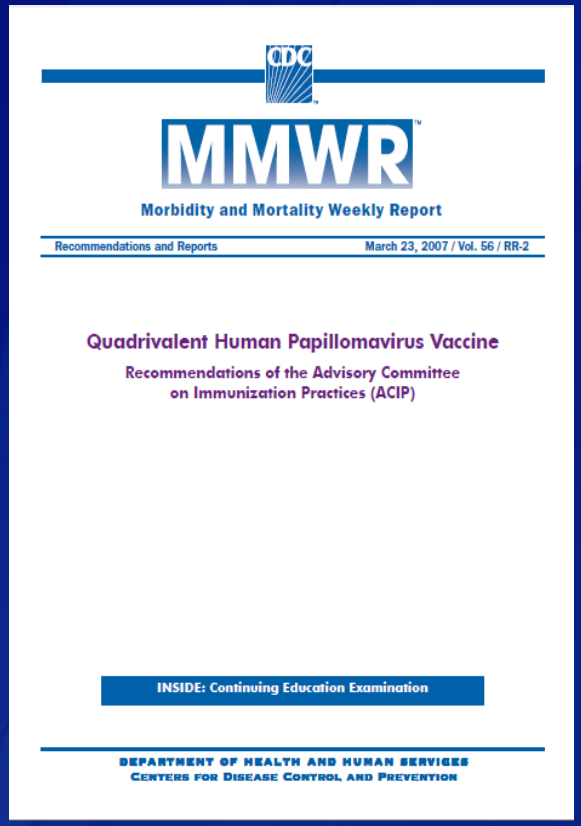
Vaccination	Age Group, yrs	Characteristic	2010	2011
Influenza	18-65	All	30.8	33.1
HPV ≥1 dose	19-26	Females	20.7	29.5
HPV ≥1 dose	19-26	Males	0.6	2.1
Tdap	19-64	With Infant	10.6	21.5
Tdap	19-64	Without Infant	8.1	12.1
Pneumococcal	19-64	High-risk	18.5	20.1
Pneumococcal	≥65	All	59.7	62.3
Herpes Zoster	≥60	All	14.4	15.8

*Data source: 2010 National Health Interview Survey. CDC. Adult Vaccination Coverage — United States, 2010. MMWR 2012; 61(04);66-72.

**Hepatitis B, 19-49 HR data not collected in 2011; Hepatitis B vaccination in diabetics not assessed in 2010.

ACIP VACCINE RECOMMENDATIONS

HUMAN PAPILLOMAVIRUS VACCINES (HPV)



MMWR

Morbidity and Mortality Weekly Report

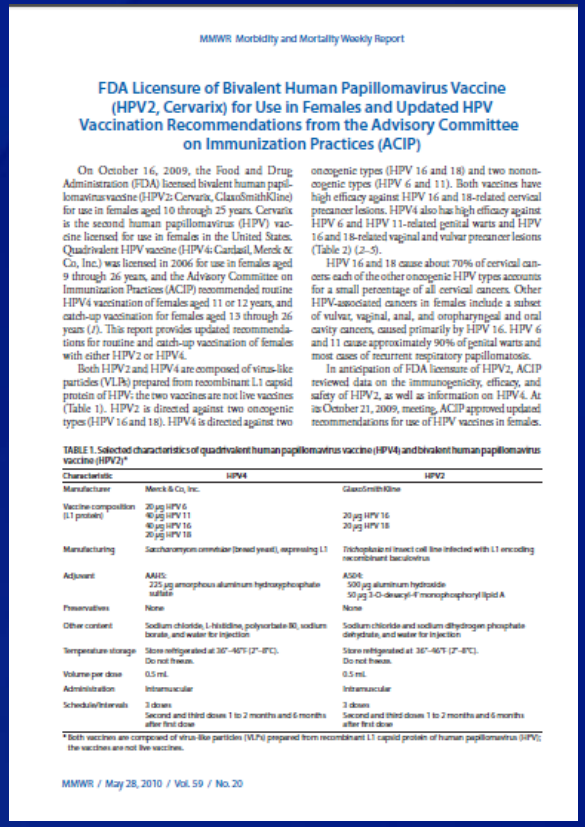
Recommendations and Reports — March 23, 2007 / Vol. 56 / RR-2

Quadrivalent Human Papillomavirus Vaccine

Recommendations of the Advisory Committee on Immunization Practices (ACIP)

INSIDE: Continuing Education Examination

DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION



MMWR Morbidity and Mortality Weekly Report

FDA Licensure of Bivalent Human Papillomavirus Vaccine (HPV2, Cervarix) for Use in Females and Updated HPV Vaccination Recommendations from the Advisory Committee on Immunization Practices (ACIP)

On October 16, 2009, the Food and Drug Administration (FDA) licensed bivalent human papillomavirus vaccine (HPV2; Cervarix, GlaxoSmithKline) for use in females aged 10 through 25 years. Cervarix is the second human papillomavirus (HPV) vaccine licensed for use in females in the United States. Quadrivalent HPV vaccine (HPV4; Gardasil, Merck & Co, Inc.) was licensed in 2006 for use in females aged 9 through 26 years, and the Advisory Committee on Immunization Practices (ACIP) recommended routine HPV4 vaccination of females aged 11 or 12 years, and catch-up vaccination for females aged 13 through 26 years (*1*). This report provides updated recommendations for routine and catch-up vaccination of females with either HPV2 or HPV4.

Both HPV2 and HPV4 are composed of virus-like particles (VLPs) prepared from recombinant L1 capsid protein of HPV; the two vaccines are not live vaccines (Table 1). HPV2 is directed against two oncogenic types (HPV 16 and 18). HPV4 is directed against two oncogenic types (HPV 16 and 18) and two nononcogenic types (HPV 6 and 11). Both vaccines have high efficacy against HPV 16 and 18-related cervical precancer lesions. HPV4 also has high efficacy against HPV 6 and HPV 11-related genital warts and HPV 16 and 18-related vaginal and vulvar precancer lesions (Table 2) (*2–5*).

HPV 16 and 18 cause about 70% of cervical cancers; each of the other oncogenic HPV types accounts for a small percentage of all cervical cancers. Other HPV-associated cancers in females include a subset of vulvar, vaginal, anal, and oropharyngeal and oral cavity cancers, caused primarily by HPV 16. HPV 6 and 11 cause approximately 90% of genital warts and most cases of recurrent respiratory papillomatosis.

In anticipation of FDA licensure of HPV2, ACIP reviewed data on the immunogenicity, efficacy, and safety of HPV2, as well as information on HPV4. At its October 21, 2009, meeting, ACIP approved updated recommendations for use of HPV vaccines in females.

TABLE 1. Selected characteristics of quadrivalent human papillomavirus vaccine (HPV4) and bivalent human papillomavirus vaccine (HPV2)*

Characteristic	HPV4	HPV2
Manufacturer	Merck & Co, Inc.	GlaxoSmithKline
Vaccine composition (L1 protein)	20 µg HPV 6 40 µg HPV 11 40 µg HPV 16 20 µg HPV 18	20 µg HPV 16 20 µg HPV 18
Manufacturing	*Saccharomyces cerevisiae* (bread yeast), expressing L1	*Trichoplusia ni* insect cell line infected with L1 encoding recombinant baculovirus
Adjuvant	AAHS: 225 µg amorphous aluminum hydroxyphosphate sulfate	ASO4: 500 µg aluminum hydroxide 50 µg 3-O-desacyl-4′ monophosphoryl lipid A
Preservatives	None	None
Other content	Sodium chloride, L-histidine, polysorbate 80, sodium borate, and water for injection	Sodium chloride and sodium dihydrogen phosphate dehydrate, and water for injection
Temperature storage	Store refrigerated at 36°–46°F (2°–8°C). Do not freeze.	Store refrigerated at 36°–46°F (2°–8°C). Do not freeze.
Volume per dose	0.5 mL	0.5 mL
Administration	Intramuscular	Intramuscular
Schedule/Intervals	3 doses Second and third doses 1 to 2 months and 6 months after first dose	3 doses Second and third doses 1 to 2 months and 6 months after first dose

* Both vaccines are composed of virus-like particles (VLPs) prepared from recombinant L1 capsid protein of human papillomavirus (HPV); the vaccines are not live vaccines.

FDA Licensure of Quadrivalent Human Papillomavirus Vaccine (HPV4, Gardasil) for Use in Males and Guidance from the Advisory Committee on Immunization Practices (ACIP)

On October 16, 2009, the Food and Drug Administration licensed quadrivalent human papillomavirus vaccine (HPV4; Gardasil, Merck & Co. Inc.) for use in males aged 9 through 26 years for prevention of genital warts caused by human papillomavirus (HPV) types 6 and 11. HPV4 had been licensed previously for use in females aged 9 through 26 years for prevention of HPV 6, 11, 16, and 18-related outcomes (i.e., vaginal, vulvar, and cervical precancers and cancers and genital warts). The Advisory Committee on Immunization Practices (ACIP) recommends routine vaccination of females at age 11 or 12 years and catch-up vaccination for females aged 13 through 26 years (*1*). On October 21, 2009, ACIP provided guidance that HPV4 may be given to males aged 9 through 26 years to reduce their likelihood of acquiring genital warts: ACIP does not recommend HPV4 for routine use among males. This report presents the ACIP policy statement and summarizes background data. Issues reviewed by ACIP included efficacy, immunogenicity, and safety of the HPV4 vaccine in males, epidemiology of HPV and burden of HPV-associated diseases and cancers in males, cost-effectiveness of male vaccination, and programmatic considerations.

HPV types 6 and 11 cause approximately 90% of genital warts and most cases of recurrent respiratory papillomatosis. Approximately 500,000 cases of genital warts are estimated to occur each year in the United States among sexually active men and women (*2,3*). Direct medical costs related to genital warts are estimated at $200 million per year (*2,3*); in addition, genital warts can have an adverse impact on quality of life (*4*). HPV-associated cancers in males include certain anal, penile, and oropharyngeal and oral cavity cancers caused primarily by HPV 16.

HPV4 has high efficacy for prevention of genital warts. The phase III efficacy study enrolled 4,065 males aged 16 through 26 years. Participants were enrolled from North America, South America, Europe, Australia, and Asia. The efficacy for prevention of genital warts related to HPV types 6, 11, 16, or 18 among males who received all 3 vaccine doses and were seronegative at day 1, and DNA negative day 1 through month 7 to the respective HPV type (per protocol population) was 89.4%; the efficacy for HPV 6 or 11-related genital warts alone was approximately the same (Table) (*5*). The efficacy for prevention of HPV 6, 11, 16, or 18-related genital warts among males who received at least 1 vaccine dose and regardless of baseline DNA or serology (intent to treat population), was 67.2%, and the efficacy for prevention of genital warts related to any HPV type was 62.1% (Table) (*5*). No evidence of efficacy was observed among males who were infected with the respective HPV type at baseline. The median duration of follow-up at the time of the study's interim analysis was approximately 2.3 years.

Data on immunogenicity in males are available from the phase III trial conducted among males aged 16 through 26 years, and from bridging immunogenicity studies conducted among males aged 9 through 15 years (*5*). Seroconversion rates were high for all four HPV types (HPV 6, 11, 16, or 18) targeted by HPV4, and postvaccination antibody titers were significantly higher in males aged 9 through 15 years compared with males aged 16 through 26 years (*5*).

As observed previously with females, in the clinical trials for males, the most common adverse events were injection-site reactions, most of which were mild or moderate in intensity (*5*). Headache and fever were the most commonly reported systemic adverse reactions in both treatment groups (*5*). Postlicensure data in females indicate that HPV4 adverse events are similar to adverse events reported following administration of other vaccines to adolescents (*6*).

Mathematical modeling suggests that adding male HPV vaccination to a female-only HPV vaccination program is not the most cost-effective vaccination strategy for reducing the overall burden of HPV-associated conditions in males and females when vaccination coverage of females is high (>80%) (*7*). When coverage of females is less than 80%, male vaccination might be cost-effective, although results vary substantially across models (*7*). Because the health burden is greater in females than males, and numerous models have shown vaccination of adolescent girls to be a cost-effective use of public health resources,

http://www.cdc.gov/vaccines/pubs/ACIP-list.htm#hpv

HPV Vaccines

Quadrivalent/HPV4 (Gardasil)	**Name**	**Bivalent/HPV2** (Cervarix)
Merck	**Manufacturer**	GlaxoSmithKline
6, 11, 16, 18	**Types**	16, 18
Females: Anal, cervical, vaginal and vulvar precancer and cancer; Genital warts **Males:** Anal precancer and cancer; Genital warts	**Indications**	**Females:** Cervical precancer and cancer **Males:** Not approved for use in males
Pregnancy Hypersensitivity to yeast	**Contraindications**	Pregnancy Hypersensitivity to latex (latex only contained in pre-filled syringes, not single-dose vials)
3 dose series: 0, 2, 6 months	**Schedule (IM)**	3 dose series: 0, 1, 6 months

ACIP Recommendation for HPV Vaccine

- Routine HPV vaccination recommended for males and females ages 11-12 years
- Catch-up both males and females
  - Females:13-26 years
  - Males: 13-21 years; 22-26 years if immunocompromised or MSM
- Permissive use ages 9-10 years for both males and females; 22-26 for males

Reasons that parents had for not intending to vaccinate daughters in next 12 months, for HPV, NIS – Teen 2012

%	Reason
19.1%	Vaccine not needed
14.2%	Vaccine not recommended
13.1%	Vaccine safety concerns
12.6%	Lack of knowledge about vaccine/disease
10.1%	Daughter not sexually active

MMWR: **July 26, 2013 / 62(29);591-595**

HPV Immunization Rates 13-17 Years of Age

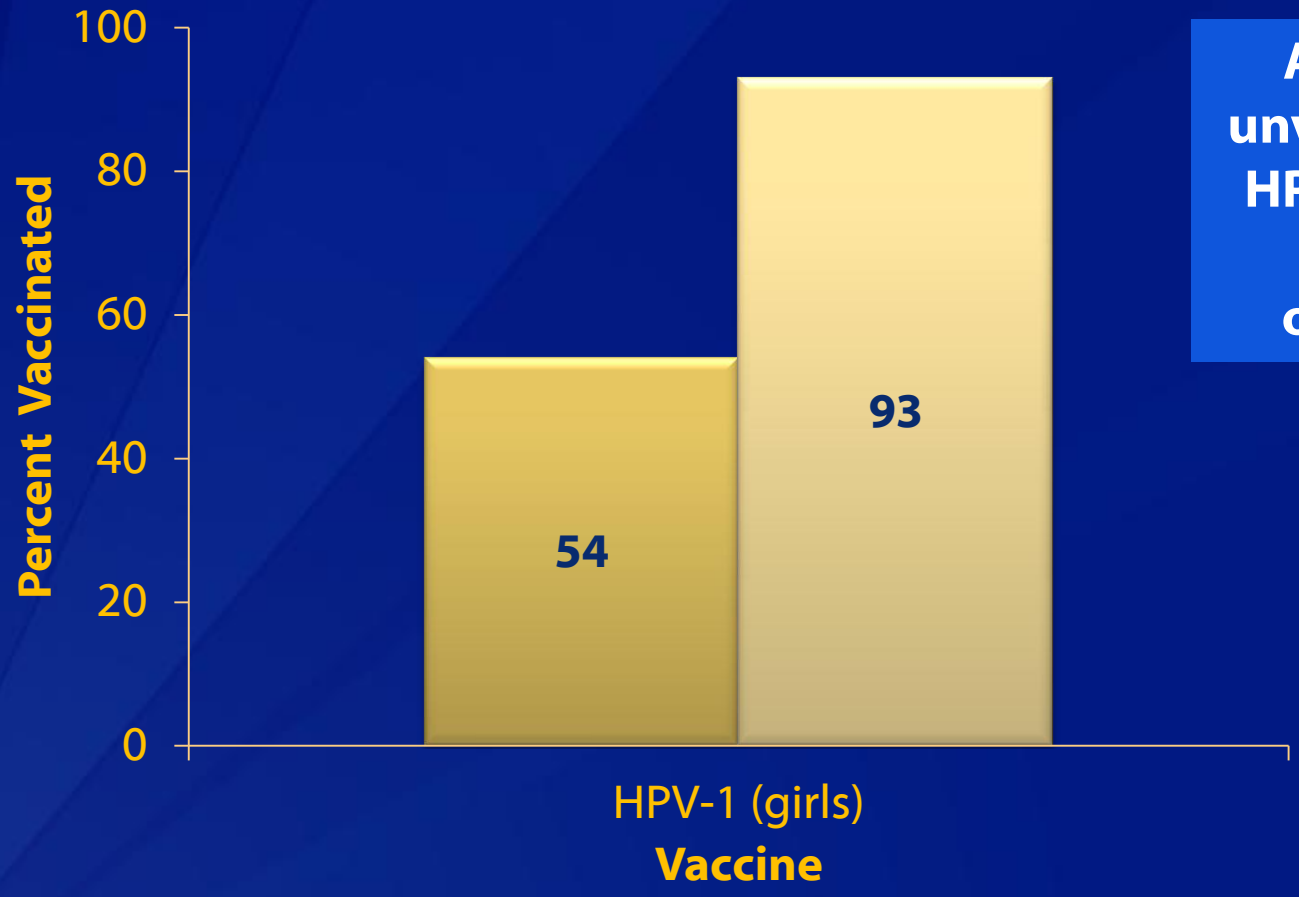
HPV Vaccine	2012	
	US	KS
1 or more doses*	53.8%	42.7%
3 dose series completion**	33.4%	25.1%

*Percentages ≥1 human papillomavirus vaccine, either HPV4 or HPV2 reported among females only (n=11,2360)

** ≥3 doses of human papillomavirus vaccine, either quadrivalent or bivalent. Some adolescents may have received more than the three recommended HPV doses.

MMWR 2013; 62 (No. 34):685-93

Actual and Achievable Vaccination Coverage if Missed Opportunities Were Eliminated: Adolescents 13-17 Years, NIS-Teen 2012



Among girls unvaccinated for HPV, 84% had a missed opportunity

- Actual
- Achievable

Missed opportunity: Encounter when some, but not all ACIP-recommended vaccines are given.
HPV-1: Receipt of at least one dose of HPV.

Avoid Missed Opportunities

- Recommend HPV vaccine
  - include HPV vaccine when discussing other needed vaccines
- HPV vaccine can safely be given at the same time as the other recommended adolescent vaccines
- Integrate standard procedures
  - Assess for needed vaccines at every clinical encounter, including acute care visits
  - Immunize at *every* opportunity
  - Use standing orders
- Document doses in the registry (MCIR)
- Use reminder and recall

Tools for improving uptake of HPV: www.cdc.gov/vaccines/teens

HPV Provider Resources

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Vaccines Home > Vaccines & Preventable Diseases > HPV Vaccination

Vaccine-Related Topics

- Immunization Schedules
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- Vaccines & Preventable Diseases
  - Vaccine Shortages & Delays
  - Potential New Vaccines
  - FAQ about Vaccines & Diseases they Prevent
- Basics and Common Questions
- Vaccination Records
- Vaccine Safety and Adverse Events
- For Travelers
- For Specific Groups of People
- Campaign Materials

Additional Resources

Vaccines and Preventable Diseases:

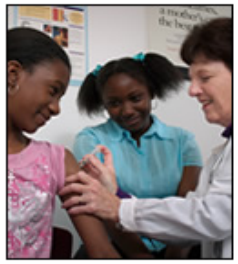
HPV Vaccination

Human Papillomavirus (HPV)

At a glance:

Human Papillomavirus (HPV) is a common virus that is spread through sexual contact. Most of the time HPV has no symptoms so people do not know they have it.

There are approximately 40 types of genital HPV. Somes types can cause cervical cancer in women and can also cause other kinds of cancer in both men and women. Other types can cause genital warts in both males and females. The HPV vaccine works by preventing the most common types of HPV that cause cervical cancer and genital warts. It is given as a 3-dose vaccine.



What You Should Know:

About the Disease | Vaccine Information | Vaccine Safety | Who Should Not be Vaccinated?

For Health Professionals:

Clinical | Recommendations | References & Resources | Provider Education | Materials for Patients

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Also Known As & Abbreviations

- HPV=Human Papillomavirus
- HPV Vaccine=Cervical Cancer Vaccine
- HPV can cause genital warts

Related Pages

- HPV and Pre-teen Campaign Flyers &

http://www.cdc.gov/vaccines/vpd-vac/hpv/default.htm

What would you do?

- If a dose of HPV vaccine is significantly delayed, should the series be restarted?

- Yes
- No

No.
Do not restart the series.
Just pick up where the patient left off and complete the series.

PERTUSSIS VACCINATION

PERTUSSIS VACCINATION FOR 7 YEARS AND OLDER

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Morbidity and Mortality Weekly Report (*MMWR*)

MMWR

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Updated Recommendations for Use of Tetanus Toxoid, Reduced Diphtheria Toxoid, and Acellular Pertussis Vaccine (Tdap) in Pregnant Women — Advisory Committee on Immunization Practices (ACIP), 2012

Weekly
February 22, 2013 / 62(07);131-135

In October 2011, in an effort to reduce the burden of pertussis in infants, the Advisory Committee on Immunization Practices (ACIP) recommended that unvaccinated pregnant women receive a dose of tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine (Tdap) (*1*). Vaccination of women with Tdap during pregnancy is expected to provide some protection to infants from pertussis until they are old enough to be vaccinated themselves. Tdap given to pregnant women will stimulate the development of maternal antipertussis antibodies, which will pass through the placenta, likely providing the newborn with protection against pertussis in early life, and will protect the mother from pertussis around the time of delivery, making her less likely to become infected and transmit pertussis to her infant (*1*). The 2011 Tdap recommendation did not call for vaccinating pregnant women previously vaccinated with Tdap. On October 24, 2012, ACIP voted to recommend use of Tdap during every pregnancy. This report summarizes data considered and conclusions made by ACIP and provides guidance for implementing its recommendations. These updated recommendations on use of Tdap in pregnant women aim to optimize strategies for preventing pertussis morbidity and mortality in infants.

The United States has experienced substantial increases in reported pertussis cases over the past several years. Provisional case counts for 2012 have surpassed the last peak year, 2010, with 41,880 pertussis cases and 14 deaths in infants aged <12 months (*2*) (CDC, unpublished data, 2012). To reduce this burden, optimizing the current vaccination program and protecting infants who are at highest risk for death are immediate priorities. Since the 2011 ACIP vaccination recommendation, uptake of Tdap among pregnant women has been low; one survey of 1,231 women (August 2011 to April 2012) estimated that only 2.6% of women received Tdap during their recent pregnancy (*3*). New data indicate that maternal antipertussis antibodies are short-lived; therefore, Tdap vaccination in one pregnancy will not provide high levels of antibodies to protect newborns during subsequent pregnancies (*4*).

Methods

In monthly teleconferences during 2012, the ACIP Pertussis Vaccines Work Group considered published, peer-reviewed literature and unpublished data relevant to vaccinating pregnant women with Tdap. When data were not available, expert opinion was considered. Summaries of the data reviewed and work group discussions were presented to ACIP before recommendations were proposed. The proposed Tdap recommendation for pregnant women was presented at the October 2012 ACIP meeting and approved by ACIP.

Summary of ACIP Deliberations and Rationale

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Morbidity and Mortality Weekly Report (*MMWR*)

MMWR

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Updated Recommendations for Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis (Tdap) Vaccine from the Advisory Committee on Immunization Practices, 2010

Weekly
January 14, 2011 / 60(01);13-15

Despite sustained high coverage for childhood pertussis vaccination, pertussis remains poorly controlled in the United States. A total of 16,858 pertussis cases and 12 infant deaths were reported in 2009 (*1*; CDC, unpublished data, 2009). Although 2005 recommendations by the Advisory Committee on Immunization Practices (ACIP) called for vaccination with tetanus toxoid, reduced diphtheria toxoid and acellular pertussis (Tdap) for adolescents and adults to improve immunity against pertussis, Tdap coverage is 56% among adolescents and <6% among adults (*2,3*). In October 2010, ACIP recommended expanded use of Tdap. This report provides the updated recommendations, summarizes the safety and effectiveness data considered by ACIP, and provides guidance for implementing the recommendations.

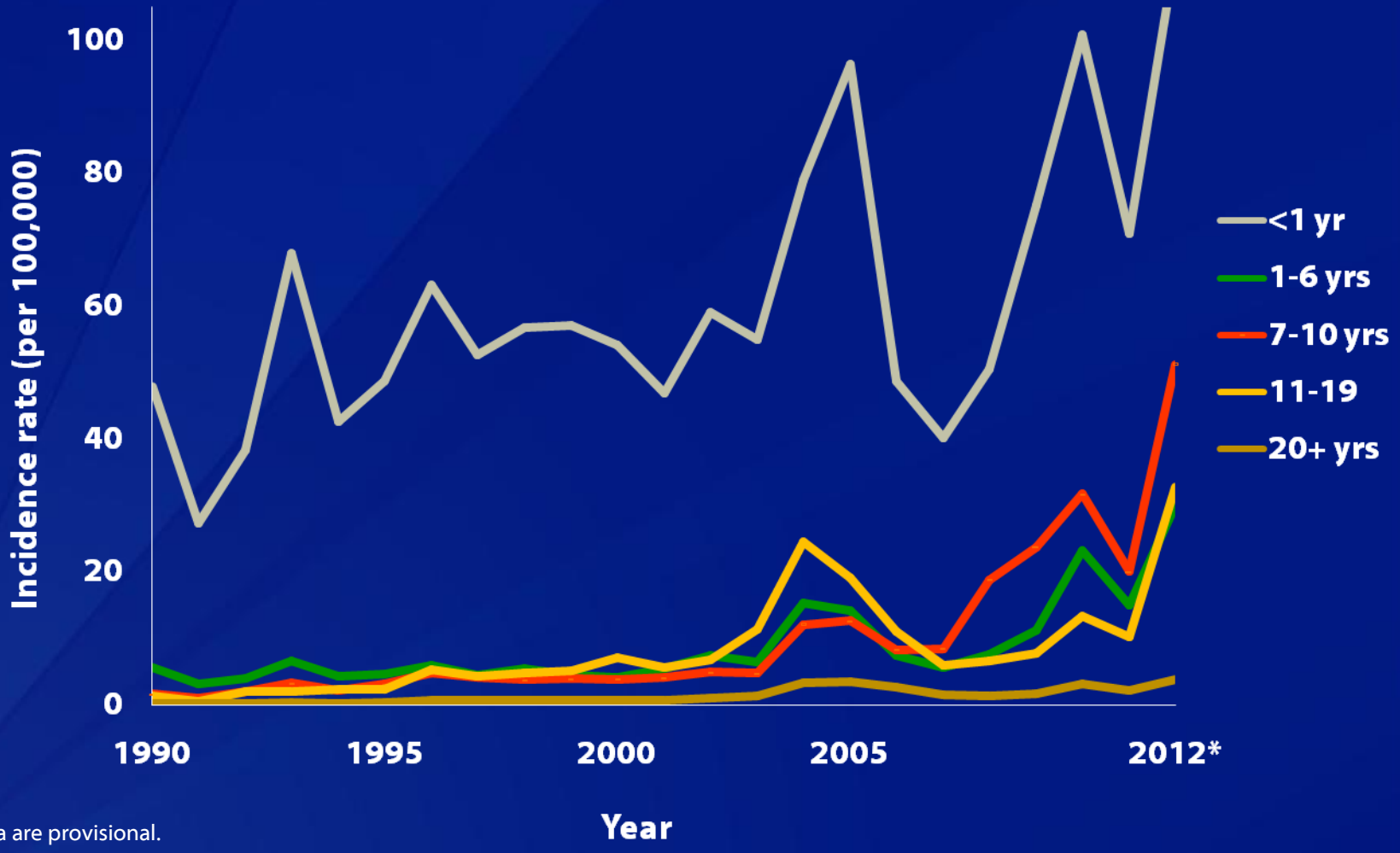
ACIP recommends a single Tdap dose for persons aged 11 through18 years who have completed the recommended childhood diphtheria and tetanus toxoids and pertussis/diphtheria and tetanus toxoids and acellular pertussis (DTP/DTaP) vaccination series and for adults aged 19 through 64 years (*4,5*). Two Tdap vaccines are available in the United States. Boostrix (GlaxoSmithKline Biologicals, Rixensart, Belgium) is licensed for use in persons aged 10 through 64 years, and Adacel (Sanofi Pasteur, Toronto, Canada) is licensed for use in persons aged 11 through 64 years. Both Tdap products are licensed for use at an interval of at least 5 years between the tetanus and diphtheria toxoids (Td) and Tdap dose. On October 27, 2010, ACIP approved the following additional recommendations: 1) use of Tdap regardless of interval since the last tetanus- or diphtheria-toxoid containing vaccine, 2) use of Tdap in certain adults aged 65 years and older, and 3) use of Tdap in undervaccinated children aged 7 through 10 years.

The Pertussis Vaccines Working Group of ACIP reviewed published and unpublished Tdap immunogenicity and safety data from clinical trials and observational studies on use of Tdap. The Working Group also considered the epidemiology of pertussis, provider and program feedback, and data on the barriers to receipt of Tdap. The Working Group then presented policy options for consideration to the full ACIP. These additional recommendations are intended to remove identified barriers and programmatic gaps that contribute to suboptimal vaccination coverage. An important barrier that limited vaccination of persons with Tdap was unknown history of Td booster. Programmatic gaps included lack of a licensed Tdap vaccine for children aged 7 through 10 years and adults aged 65 years and older. In light of the recent increase of pertussis in the United States, the additional recommendations are made to facilitate use of Tdap to reduce the burden of disease and risk for transmission to infants (Box).

Timing of Tdap Following Td

http://www.cdc.gov/vaccines/pubs/ACIP-list.htm#tdap

Reported Pertussis Incidence by Age Group: 1990-2012*



*2012 data are provisional.

SOURCE: CDC, National Notifiable Diseases Surveillance System and Supplemental Pertussis Surveillance System

Comparing Tetanus- & Diphtheria-Toxoid, and Pertussis-Containing Vaccines

	DTaP	Tdap	Td
Ages	6 weeks thru 6 years	7 years and older*	7 years and older*
Doses	Multiple doses	One dose in a lifetime for most persons*	Multiple doses
Administer with other vaccines	Yes		
Route	Intramuscular (IM)		

*ACIP off-label recommendation

General Principles for Use of Tdap

- Previously unvaccinated persons: Tdap preferred to Td to provide protection against pertussis
- Tdap is approved by FDA for a single booster dose
  - NOT recommended for multiple administrations except for pregnant women*
  - Tdap may be used for wound prophylaxis
- No minimum interval between the last dose of tetanus toxoid-containing vaccine and a dose of Tdap
- If possible, Boostrix should be used for adults 65 years of age and older
  - administer Adacel* if Boostrix is not available

*ACIP off-label recommendation

Tdap Recommendations

- Children 7 through 10 years who are not "fully vaccinated against pertussis"*
- Routinely at 11 or 12 years of age
- Catch up teens 13 through 18 years who have not been vaccinated with Tdap
- Unvaccinated adults 19 years and older

*ACIP off-label recommendation

Children "* not fully vaccinated"

- Fully vaccinated is defined as 5 doses of DTaP or 4 doses of DTaP if the fourth dose was administered on or after the fourth birthday

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6001a4.htm

Tdap and Pregnancy

- Administer Tdap to pregnant women during each pregnancy, regardless of previous Tdap vaccination history*
- Ideally vaccinate between 27 and 36 weeks gestation although Tdap may be given at any time during pregnancy
  - between 27 and 36 weeks gestation is optimal timing to maximize the maternal antibody response AND passive antibody transfer to the infant

*ACIP off-label recommendation; MMWR. Vol. 62 No. 7; February 22, 2013.

ACIP Conclusions
Tdap Protection for Subsequent Pregnancies

- Maternal antibodies from women immunized before pregnancy waned quickly (Healy 2012)
  - Concentration of maternal antibodies unlikely high enough to provide passive protection to infants
- A single dose of Tdap during one pregnancy is insufficient to provide protection for subsequent pregnancies

ACIP Conclusions
Tdap for Every Pregnancy

- Data reassuring on safety of 2 doses of Tdap and multiple doses of tetanus toxoid containing vaccines
- ~5% of women would receive 4 or more doses of Tdap
- ACIP concluded that experience with tetanus-toxoid containing vaccines suggests no excess risk for severe adverse events for women receiving Tdap with every pregnancy
- Supported ongoing safety monitoring and requested that CDC commit to safety studies to address concerns about the potential increase in severe adverse events after Tdap is given during subsequent pregnancies

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6207a4.htm

Tdap and Postpartum Women

- Postpartum women *not previously vaccinated* with Tdap should be administered immediately
  - including women who are breastfeeding
- Do not administer Tdap to postpartum women who have already been vaccinated with Tdap
  - regardless of the length of time since Tdap vaccination

What would you do?

- Your patient just delivered her first child.
  She was previously vaccinated with Tdap as an adolescent. She did not receive Tdap during this pregnancy.
  Do you administer Tdap prior to discharge?

- Yes
- No

No.
Tdap is not recommended for multiple administrations EXCEPT for pregnant women.

PNEUMOCOCCAL VACCINES

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Morbidity and Mortality Weekly Report (*MMWR*)

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Use of 13-Valent Pneumococcal Conjugate Vaccine and 23-Valent Pneumococcal Polysaccharide Vaccine for Adults with Immunocompromising Conditions: Recommendations of the Advisory Committee on Immunization Practices (ACIP)

Weekly
October 12, 2012 / 61(40);816-819

On June 20, 2012, the Advisory Committee on Immunization Practices (ACIP) recommended routine use of 13-valent pneumococcal conjugate vaccine (PCV13; Prevnar 13, Wyeth Pharmaceuticals, Inc., a subsidiary of Pfizer, Inc.) for adults aged ≥19 years with immunocompromising conditions, functional or anatomic asplenia, cerebrospinal fluid (CSF) leaks, or cochlear implants (Table). PCV13 should be administered to eligible adults in addition to the 23-valent pneumococcal polysaccharide vaccine (PPSV23; Pneumovax 23, Merck & Co. Inc.), the vaccine currently recommended for these groups of adults (*1*). The evidence for the benefits and risk of PCV13 vaccination of adults with immunocompromising conditions was evaluated using the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) framework and designated as a Category A recommendation (*2,3*). This report outlines the new ACIP recommendations for PCV13 use; explains the recommendations for the use of PCV13 and PPSV23 among adults with immunocompromising conditions, functional or anatomic asplenia, CSF leaks, or cochlear implants; and summarizes the evidence considered by ACIP to make its recommendations.

Epidemiology of Pneumococcal Infection in Immunocompromised Adults

Streptococcus pneumoniae (pneumococcus) remains a leading cause of serious illness, including bacteremia, meningitis, and pneumonia among adults in the United States. An estimated 4,000 deaths occur in the United States each year because of *S. pneumoniae*, primarily among adults (*4*). The incidence of invasive disease ranges from 3.8 per 100,000 among persons aged 18–34 years to 36.4 per 100,000 among those aged ≥65 years (*4*). Adults with certain medical conditions also are at increased risk for invasive pneumococcal disease (IPD). For adults aged 18–64 years with hematologic cancer, the rate of IPD in 2010 was 186 per 100,000, and for persons with human immunodeficiency virus (HIV) the rate was 173 per 100,000 (CDC, unpublished data, 2012). The disease rates for adults in these groups can be more than 20 times those for adults without high-risk medical conditions.

PCV13 has been used for children since 2010, when it replaced an earlier version targeting seven serotypes (PCV7; Prevnar, Pfizer) that had been in use since 2000. The routine use of PCV7 in infants and young children resulted in significant reductions in IPD caused by vaccine serotypes in children, and because of indirect effects, also in adults. Rates of IPD caused by vaccine serotypes in adults aged 18–64 years without HIV decreased from six cases to one case per 100,000 during 2000–2007. However, even after indirect effects of the pediatric immunization had been realized fully, the incidence of IPD caused by the serotypes included in PCV7 remained high in HIV-infected persons aged 18–64 years at 64 cases per 100,000 persons with acquired immunodeficiency syndrome (AIDS) (*5*). Moreover, 50% of IPD cases among immunocompromised adults in 2010 were caused by serotypes contained in PCV13; an additional 21% were

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Morbidity and Mortality Weekly Report (*MMWR*)

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Updated Recommendations for Prevention of Invasive Pneumococcal Disease Among Adults Using the 23-Valent Pneumococcal Polysaccharide Vaccine (PPSV23)

Weekly
September 3, 2010 / 59(34);1102-1106

Invasive disease from *Streptococcus pneumoniae* (pneumococcus) is a major cause of illness and death in the United States, with an estimated 43,500 cases and 5,000 deaths among persons of all ages in 2009 (*1*). This report provides updated recommendations from the Advisory Committee on Immunization Practices (ACIP) for prevention of invasive pneumococcal disease (IPD) (i.e., bacteremia, meningitis, or infection of other normally sterile sites [*2*]) through use of the 23-valent pneumococcal polysaccharide vaccine (PPSV23) among all adults aged ≥65 years and those adults aged 19--64 years with underlying medical conditions that put them at greater risk for serious pneumococcal infection. The new recommendations include the following changes from 1997 ACIP recommendations (*2*): 1) the indications for which PPSV23 vaccination is recommended now include smoking and asthma, and 2) routine use of PPSV23 is no longer recommended for Alaska Natives or American Indians aged <65 years unless they have medical or other indications for PPSV23. ACIP recommendations for revaccination with PPSV23 among the adult patient groups at greatest risk for IPD (i.e., persons with functional or anatomic asplenia and persons with immunocompromising conditions) remain unchanged (*2*). ACIP recommendations for prevention of pneumococcal disease among infants and youths aged ≤18 years using the 13-valent pneumococcal conjugate vaccine (PCV13) and PPSV23 are published separately (*3*).

Changes in IPD Incidence

Indirect vaccine effects (i.e., herd effects) have reduced pneumococcal infections among unvaccinated persons of all ages, including those aged ≥65 years, since introduction of the routine infant 7-valent pneumococcal conjugate vaccine (PCV7) immunization program in 2000 (*4*). Data from Active Bacterial Core surveillance (ABCs)* indicate that, by 2007, the overall incidence rate of IPD among persons of all ages had decreased by 45% (from 24.4, to 13.5 per 100,000 population), compared with 1998--1999 before PCV7 was introduced (*4*). Among persons aged 18--49 years, 50--64 years, and ≥65 years, rates of IPD decreased 40%, 18%, and 37%, respectively. The decreases resulted from reductions of 87% to 92% in cases of infection with serotypes covered in PCV7 (*4*). Despite the major direct and indirect PCV7 effects, IPD remains an important cause of illness and death. An estimated 43,500 cases and 5,000 deaths occurred among persons of all ages in 2009; approximately 84% of IPD cases and nearly all deaths occurred in adults (*1*).

Additional indirect effects can be expected to occur when the PCV13 immunization program, initiated in 2010, is fully implemented, although the magnitude of these effects is difficult to predict (*3*). In 2008, the serotypes covered in PCV13 caused 53%, 49%, and 44% of IPD cases among persons aged 18--49 years, 50--64 years, and ≥65 years, respectively; serotypes covered in PPSV23 caused 78%, 76%, and 66% of IPD cases among persons in these age groups (Figure).

Risk Factors for IPD Among Adults

http://www.cdc.gov/vaccines/pubs/ACIP-list.htm#pcv

Comparing Pneumococcal Vaccines

	Pneumococcal Polysaccharide (Pneumovax 23)	Pneumococcal Conjugate (Prevnar 13)
Ages	2 years and older (high-risk only)	6 weeks and older*
Abbreviation	PPSV23	PCV13
Route	Intramuscular (IM) or Subcutaneous (Subcut.)	Intramuscular (IM)

*ACIP off-label recommendation

PCV13 for Children Birth through 18 Years of Age

- Four doses of PCV13 at ages 2, 4, 6 and12 through 15 months
  - Catch up per catch-up schedule
    - 4-week minimum interval between primary doses
    - 8-week interval between last primary dose and booster and minimum of 12 months of age
- One supplemental dose for children 14 through 59 months who have received an age-appropriate series of PCV7

PCV13 for Children Birth through 18 Years of Age

- One dose for high-risk children 6 through 18 years who have not received PCV13
  - asplenia
    - functional or anatomic, sickle cell
  - immunocompromised
    - congenital or acquired from disease or treatment
    - chronic renal failure
    - nephrotic syndrome
    - solid organ transplant
    - HIV
  - cerebrospinal fluid leak
  - cochlear implant

PPSV23 for High-Risk Children 2 through 18 Years

- One dose of PPSV23 at least 8 weeks after the last dose of PCV13 to children 2 years or older with:
  - chronic heart disease (particularly cyanotic congenital heart disease and cardiac failure)
  - chronic lung disease (including asthma if treated with high-dose oral corticosteroid therapy)
  - diabetes mellitus
  - cerebrospinal fluid leaks
  - cochlear implant
  - anatomic or functional asplenia (including sickle cell disease and other hemoglobinopathies, congenital or acquired asplenia, or splenic dysfunction)
  - imunocompromising condition

- One revaccination PPSV23 dose 5 years after first dose for children with:
  - anatomic or functional asplenia (including sickle cell disease)
  - an immunocompromising condition

PCV13 and PPSV23 for High-Risk Adults 19 Years and Older*

- Administer a single dose of PCV13 to pneumococcal naïve adults with a high-risk condition including:
  - functional or anatomic asplenia, including sickle cell
  - chronic renal failure and nephrotic syndrome
  - CSF leak
  - cochlear implants
- Followed by a dose of PPSV23 at least 8 weeks later
- High risk adults who have previously received one or more doses of PPSV23, should receive a dose of PCV13 one or more years after the last PPSV23 dose was received

*ACIP off-label recommendation for PCV13 for adults 19 through 49 years of age

PPSV23 Second Dose for Adults 19 through 64 Years of Age

- Administer a second dose of PPSV23 at least 5 years after first dose of PPSV23 and at least 8 weeks after a dose of PCV13 to immunocompromised adults 19 through 64 years of age with:
  - functional or anatomic asplenia, including sickle cell disease
  - chronic renal failure or nephrotic syndrome
  - immunocompromising conditions including:
  - HIV, leukemia, lymphoma, Hodgkin's disease, multiple myeloma, generalized malignancy
  - immunosuppressive therapy (e.g., long-term systemic corticosteroids or radiation therapy)
  - organ or bone marrow transplant
- Does NOT apply to CSF leak or cochlear implant

Risk Group	Underlying Medical Condition		PPSV23	
		Re d	Recommended	Revaccination at 5 years
Immunocompetent persons	Chronic heart disease		✓	
	Chronic lung disease		✓	
	Diabetes mellitus		✓	
	CSF leaks	✓	✓	
	Cochlear implants	✓	✓	
	Alcoholism		✓	
	Chronic liver disease		✓	
	Cigarette smoking		✓	
Persons with functional or anatomic asplenia	Sickle cell disease/other hemaglobinopathies	✓	✓	✓
	Congenital or acquired asplenia	✓	✓	✓
Immunocompromised persons	Congenital or acquired immunodeficiencies	✓	✓	✓
	HIV infection	✓	✓	✓
	Chronic renal failure	✓	✓	✓
	Nephrotic syndrome	✓	✓	✓
	Leukemia	✓	✓	✓
	Lymphoma	✓	✓	✓
	Hodgkin disease	✓	✓	✓
	Generalized malignancy	✓	✓	✓
	Iatrogenic immunosuppression	✓	✓	✓
	Solid organ transplant	✓	✓	✓
	Multiple myeloma	✓	✓	✓

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6140a4.htm

PPSV23 for Adults 65 Years of Age and older

- Persons who received PPSV23 before age 65 years for any indication should receive another dose at age 65 or older if at least 5 years have passed since previous dose and 8 weeks since a dose of PCV13
- Those vaccinated with PPSV23 at or after age 65 do not need any additional doses

Administering PCV13 and PPSV23 Vaccines

- PCV13 and PPSV23 should not be administered simultaneously
- Administer PCV13 before PPSV23, whenever possible
- If PCV13 is administered first, wait 8 weeks to administer PPSV23
- If PPSV23 has already been administered, wait at least:
  - 8 weeks to administer PCV13 for children ages 2 through18 years
  - 1 year to administer PCV13 for adults ages 19 years and older

Pneumococcal Vaccination Recommendations for Children[1] and Adults by Age and/or Risk Factor

Risk Group	Underlying medical condition or other risk factor	Recommendations for Vaccination with Pneumococcal Conjugate Vaccine (PCV13)			Recommendations for Vaccination with Pneumococcal polysaccharide vaccine (PPSV23)		
		Administer doses needed to complete schedule to children through age 71 months	*Consider* administering 1 dose to PCV13-naïve children age 6–18 years	Administer 1 dose to PCV13-naïve adults age 19 years and older	Administer 1 dose at age 2 through 64 years	Administer second dose 5 years after first dose if age <65 years	Administer 1 dose at age 65 years
Immuno-competent	Healthy adult, non-smoker						X
	Chronic heart disease[2]	X			X		X
	Chronic lung disease[3]	X			X		X
	Diabetes mellitus	X			X		X
	Cerebrospinal fluid leak	X	X	X	X		X
	Cochlear implant	X	X	X	X		X
	Alcoholism				X		X
	Chronic liver disease, cirrhosis				X		X
	Cigarette smoking (≥19 yrs)				X		X
Functional or anatomic asplenia	Sickle cell disease/other hemoglobinopathy	X	X	X	X	X	X
	Congenital or acquired asplenia	X	X	X	X	X	X
Immuno-compromised	Congenital or acquired immunodeficiency[4]	X	X	X	X	X	X
	HIV	X	X	X	X	X	X
	Chronic renal failure	X	X	X	X	X	X
	Nephrotic syndrome	X	X	X	X	X	X
	Leukemia	X	X	X	X	X	X
	Lymphoma	X	X	X	X	X	X
	Hodgkin disease	X	X	X	X	X	X
	Generalized malignancy	X	X	X	X	X	X
	Iatrogenic immunosuppression[5]	X	X	X	X	X	X
	Solid organ transplant	X	X	X	X	X	X
	Multiple myeloma	X	X	X	X	X	X

Technical content reviewed by the Centers for Disease Control and Prevention

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www.immunize.org/catg.d/p2019.pdf • Item #P2019 (2/13)

1. For PCV13 vaccination of healthy children, see "Recommendations for Pneumococcal Vaccine Use in Children" at www.immunize.org/catg.d/p2016.pdf.
2. Particularly cyanotic congenital heart disease and cardiac failure in children; excluding hypertension in adults.
3. Including asthma in children if treated with high-dose oral corticosteroid therapy; including asthma in adults.
4. Includes B- (humoral) or T-lymphocyte deficiency, complement deficiencies (particularly C1, C2, C3, and C4 deficiencies), and phagocytic disorders (excluding chronic granulomatous disease).
5. Diseases requiring treatment with immunosuppressive drugs, including long-term systemic corticosteroids and radiation therapy.

http://www.immunize.org/catg.d/p2019.pdf

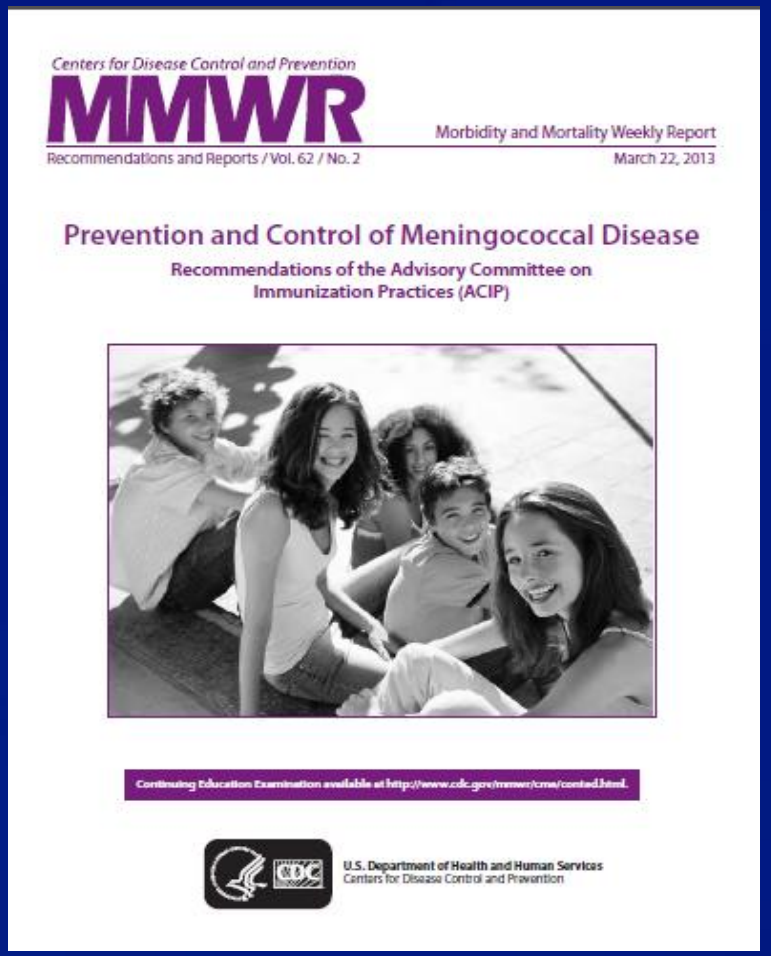
What would you do?

- A 66-year-old patient has had laboratory confirmed pneumococcal pneumonia. She has never been vaccinated with PPSV23. Should PPSV23 be administered?

- Yes
- No

Yes.
There are more than 90 known serotypes of pneumococcus. 23 serotypes are in the current vaccine. Infection with one serotype does not necessarily produce immunity to other serotypes.

MENINGOCOCCAL VACCINES



http://www.cdc.gov/mmwr/PDF/rr/rr6202.pdf

Comparing Meningococcal Vaccines

	Meningococcal Polysaccharide	Meningococcal Conjugate		Meningococcal Conjugate & Haemophilus *influenzae type b*
Brand Name	Menomune	Menactra	Menveo	Menhibrix
Ages	2 years and older	9 months through 55 years	*2 years through 55 years	6 weeks through 18 months
ACIP abbrev	MPSV4	MCV4 or MenACWY		Hib-MenCY
Route	Subcutaneous (Subcut.)	Intramuscular (IM)		

*FDA licensed to 2 months of age, not yet ACIP approved

Routine MCV4 Vaccination for Persons 11 through 21 Years of Age

Age Group	Primary Vaccination	Booster Dose*
11-12 years	1 dose	1 dose recommended if first dose administered before 16th birthday
13-18 years	1 dose if not vaccinated previously	
19-21 years	Not routinely recommended but 1 dose may be administered as catch-up vaccination for those who have not received a dose after their 16th birthday	

*ACIP off-label recommendation

Meningococcal Vaccination for Infants at Increased Risk (Persistent Complement Component Deficiency)

Risk Group	Primary Vaccination
Persistent complement component deficiencies	If younger than 19 months: administer 4 doses of MenHibrix at 2, 4, 6, and 12–15 months *If later travel to an area where A and W-135 protection are needed, administer an age-appropriate MCV4 dose prior to travel

Meningococcal Vaccination for Infants at Increased Risk (Persistent Complement Component Deficiency)

Risk Group	Primary Vaccination
Persistent complement component deficiencies	Catch-up if no prior vaccination: **If 9 through 23 months:** if no prior vaccination, administer 2 doses of Menactra 3 months apart. **If 24 months and older:** Administer 2 prior doses of either Menactra or Menveo

*ACIP off-label recommendation

Meningococcal Vaccination for Children at Increased Risk (Travelers)

Risk Group	Primary Vaccination
Travel to or resident of countries where meningococcal disease is hyperendemic or endemic	**If 9 months through 23 months:** Administer 2 doses of Menactra, 12 weeks apart *8 weeks apart if needed for travel for infants 9 through 23 months. **If 2 years and older:** Administer 1 dose of Menveo, or Menactra

*ACIP off-label recommendation

Meningococcal Vaccination for Children at Increased Risk (Outbreak)

Risk Group	Primary Vaccination
Risk during a community outbreak attributable to a vaccine serogroup	**If 9 months through 23 months:** Administer 2 doses of Menactra, 12 weeks apart **If 2 years and older:** Administer 1 dose of Menveo or Menactra, 8-12 weeks apart. If Menactra is used, it should be administered at least 4 weeks after completion of all PCV doses

*ACIP off-label recommendation

Meningococcal Vaccination for Infants at Increased Risk (Asplenia)

Risk Group	Primary Vaccination
Functional or anatomic asplenia, including sickle cell	4 doses of MenHibrix at 2, 4, 6, and 12–15 months **Because of high risk for IPD, children with functional or anatomic asplenia should not be immunized with Menactra before 2 years of age to avoid interference with the immune response to PCV series. Administer Menactra at 2 years and older and at least 4 weeks after completion of all PCV doses

Meningococcal Vaccination for Persons 2 through 55 Years of Age at Increased Risk and Not Previously Vaccinated

Risk Group	Primary Vaccination
HIV+, if another indication for vaccination exists	2 doses of MCV4, 8 to 12 weeks apart *If Menactra is used, it should be administered at least 4 weeks after completion of all PCV doses

*ACIP off-label recommendation

Meningococcal Vaccination for Persons 2 through 55 Years of Age at Increased Risk and Not Previously Vaccinated

Risk Group	Primary Vaccination
First year college students 21 yrs of age or younger living in residential housing Travel to or resident of countries where meningococcal disease is hyper endemic or endemic Risk during a community outbreak attributable to a vaccine serogroup Microbiologists routinely exposed to isolates of Neisseria meningitidis	1 dose of MCV4 *If Menactra is used, it should be administered at least 4 weeks after completion of all PCV doses.

*ACIP off-label recommendation

Meningococcal Booster Vaccination for Those At Continued Risk

- Persons who remain at increased risk and completed the primary dose or series at age:
  - 2 mos.–6 yrs.: Should receive additional dose of either MCV4
    - 3 yrs. after primary immunization; boosters should be repeated every 5 yrs. thereafter
  - 7 yrs. and older: Should receive additional dose of either MCV4
    - 5 yrs. after primary immunization; boosters should be repeated every 5 yrs. thereafter

*ACIP off-label recommendation

Meningococcal Vaccination of High-Risk Persons 56 Years of Age and Older

- MPSV4 is only licensed vaccine for persons in this age group
- MPSV4 is preferred for meningococcal vaccine-naïve persons aged 56 years and older who anticipate requiring a single dose of meningococcal vaccine (e.g., travelers and persons at risk as a result of a community outbreak
- *For persons now aged 56 years of age and older who were vaccinated previously with MCV4 and are recommended for revaccination or for whom multiple doses are anticipated (e.g., persons with asplenia and microbiologists), MCV4* is preferred*

*ACIP off-label recommendation
http://www.cdc.gov/mmwr/PDF/rr/rr6202.pdf

Meningococcal Vaccination Recommendations by Age and/or Risk Factor

This table summarizes the recommendations of CDC's Advisory Committee on Immunization Practices for the use of meningococcal vaccine.

MCV4 = Menactra (sanofi) and Menveo (Novartis) MCV4-D = Menactra
MPSV = Menomune (sanofi) Hib-MenCY = MenHibrix (GlaxoSmithKline)

TARGETED GROUP BY AGE AND/OR RISK FACTOR	PRIMARY DOSE(S)	BOOSTER DOSE(S)
People ages 11 through 18 years	Give 1 dose of MCV4, preferably at age 11 or 12 years[1]	Give booster at age 16 years if primary dose given at age 12 years or younger
		Give booster at age 16 through 18 years if primary dose given at age 13 through 15 years[2]
People ages 19 through 21 years who are are first-year college students and living in residence halls	Give 1 dose of MCV4[3]	Give booster if previous dose given at age younger than 16 years
Certain travelers,[3] people present during outbreaks caused by a vaccine serogroup,[4] and other people with prolonged increased risk for exposure (e.g., travelers to or residents of countries where meningococcal disease is hyperendemic or epidemic and microbiologists routinely working with *Neisseria meningitidis*)		
▪ for age 9 through 23 months	Give 2 doses of MCV4-D, 3 months apart[5]	If risk continues, give initial booster after 3 years, followed by boosters every 5 years
▪ for age 2 through 55 years	Give 1 dose of MCV4[3]	Boost every 5 years with MCV4[6,7]
▪ for age 56 years and older	Give 1 dose of MPSV	Boost every 5 years with MPSV[7]
People with persistent complement component deficiencies,[8] or functional or anatomic asplenia, including sickle cell disease		
▪ for age 2 through 18 months[9]	Give Hib-MenCY at ages 2, 4, 6 and 12–15 months	Give MCV4 booster after 3 years followed by MCV4 boosters every 5 years thereafter
▪ for age 9 through 23 months with persistent complement component deficiencies only (*does not include children with functional or anatomic asplenia*)	Give 2 doses of MCV4-D, 3 months apart	
▪ for ages 2 through 55 years	Give 2 doses of MCV4, 2 months apart[10]	Boost every 5 years with MCV4[6,11]
▪ for age 56 years and older	Give 1 dose of MPSV	Boost every 5 years with MPSV[11]

FOOTNOTES

1. If the person is HIV-positive, give 2 doses, 2 months apart.
2. The minimum interval between doses of MCV4 is 8 weeks.
3. Prior receipt of Hib-MenCY is not sufficient for children traveling to the Hajj or meningitis belt as it doesn't provide protection against serogroups A or W-135.
4. Seek advice of local public health authority to determine if vaccination is recommended.
5. If a child age 9 through 23 months will enter an endemic area in less than 3 months, give doses as close as 2 months apart.
6. If primary dose(s) given when younger than age 7 years, give initial booster after 3 years, followed by boosters every 5 years.
7. Boosters are recommended if the person remains at increased risk.
8. Persistent complement component deficiencies include C3, C5-C9, properdin, factor H, and factor D.
9. Children ages 2 through 18 months who are present during outbreaks caused by serogroups C or Y may be given an age-appropriate series of Hib-MenCY.
10. Children with functional or anatomic asplenia should complete a PCV13 vaccine series before vaccination with MCV4; if MCV4-D is to be given, vaccinate at least 4 weeks following last dose of PCV13.
11. If the person received a 1-dose primary series, give booster at the earliest opportunity, then boost every 5 years.

Technical content reviewed by the Centers for Disease Control and Prevention

IMMUNIZATION ACTION COALITION 1573 Selby Avenue • St. Paul, MN 55104 • 651-647-9009 • www.immunize.org • www.vaccineinformation.org

www.immunize.org/catg.d/p2018.pdf • Item #P2018 (12/12)

http://www.immunize.org/catg.d/p2018.pdf

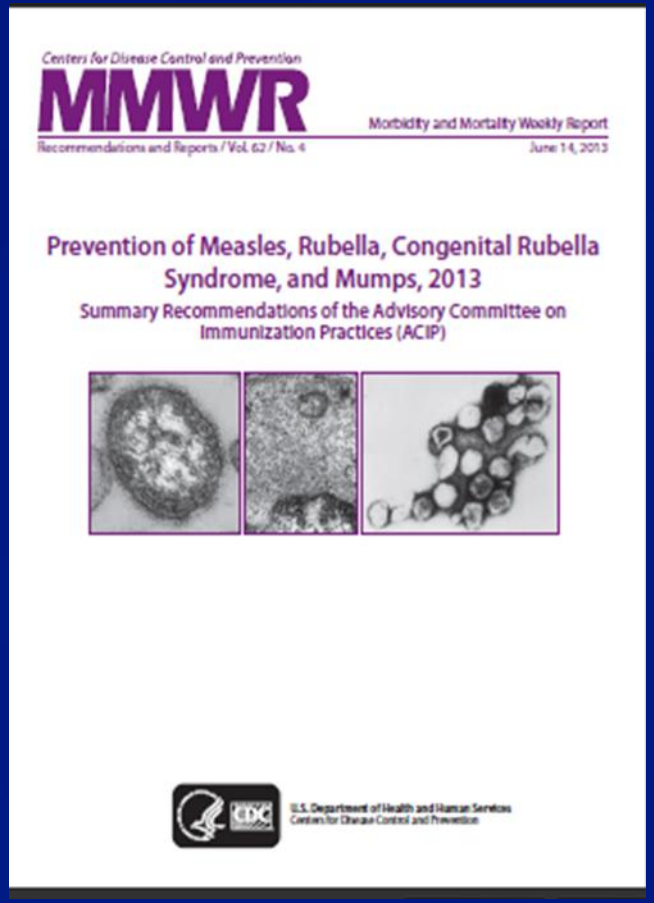
What would you do?

- We administered MCV4 subcutaneously instead of the approved intramuscular route. Should we repeat the dose?

- Yes
- No

No.
The dose may be counted but this is considered a vaccine administration error. You should determine the root cause of the error and put strategies in place to prevent it from happening again in the future.

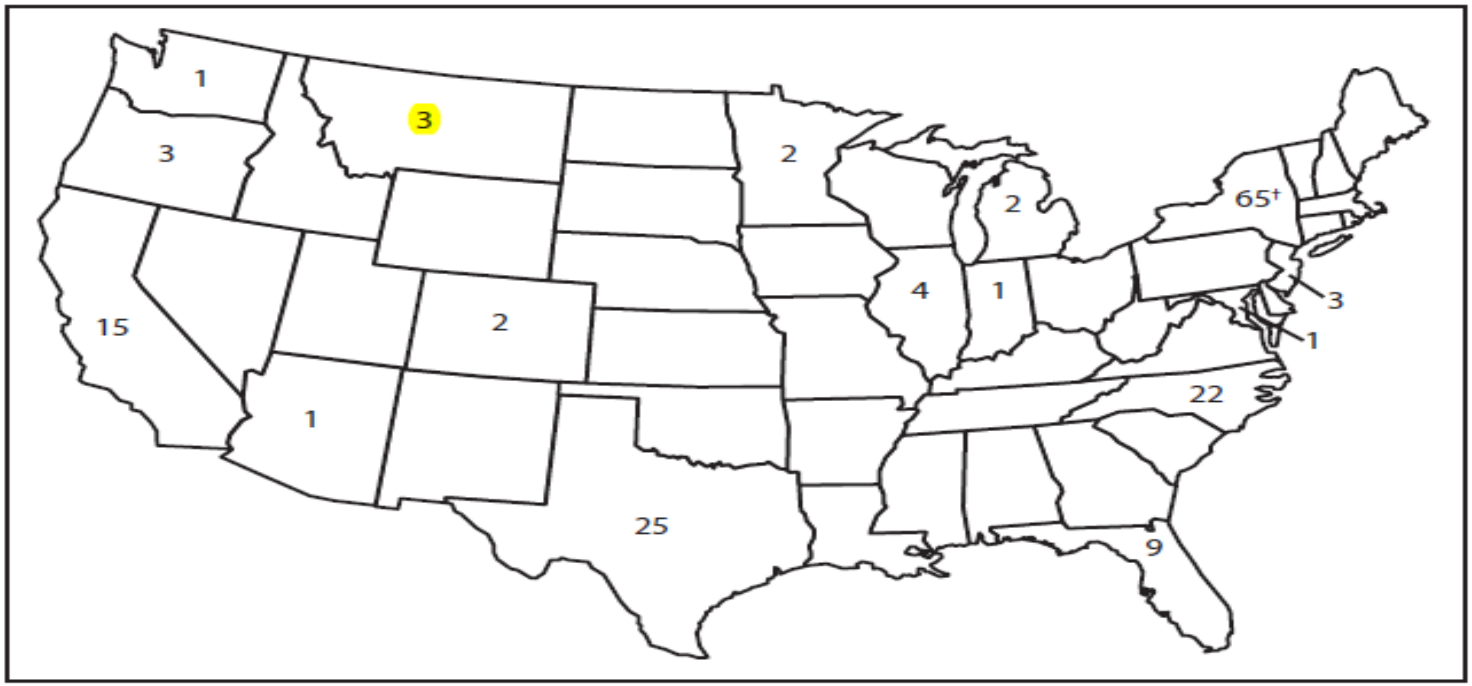
MEASLES MUMPS AND RUBELLA VACCINE



http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm

Measles cases per State – US 2013

FIGURE 2. Number of measles cases (N = 159), by state — United States, 2013*



* As of August 24, 2013.
† Includes New York City.

http://www.cdc.gov/mmwr/pdf/wk/mm6236.pdf

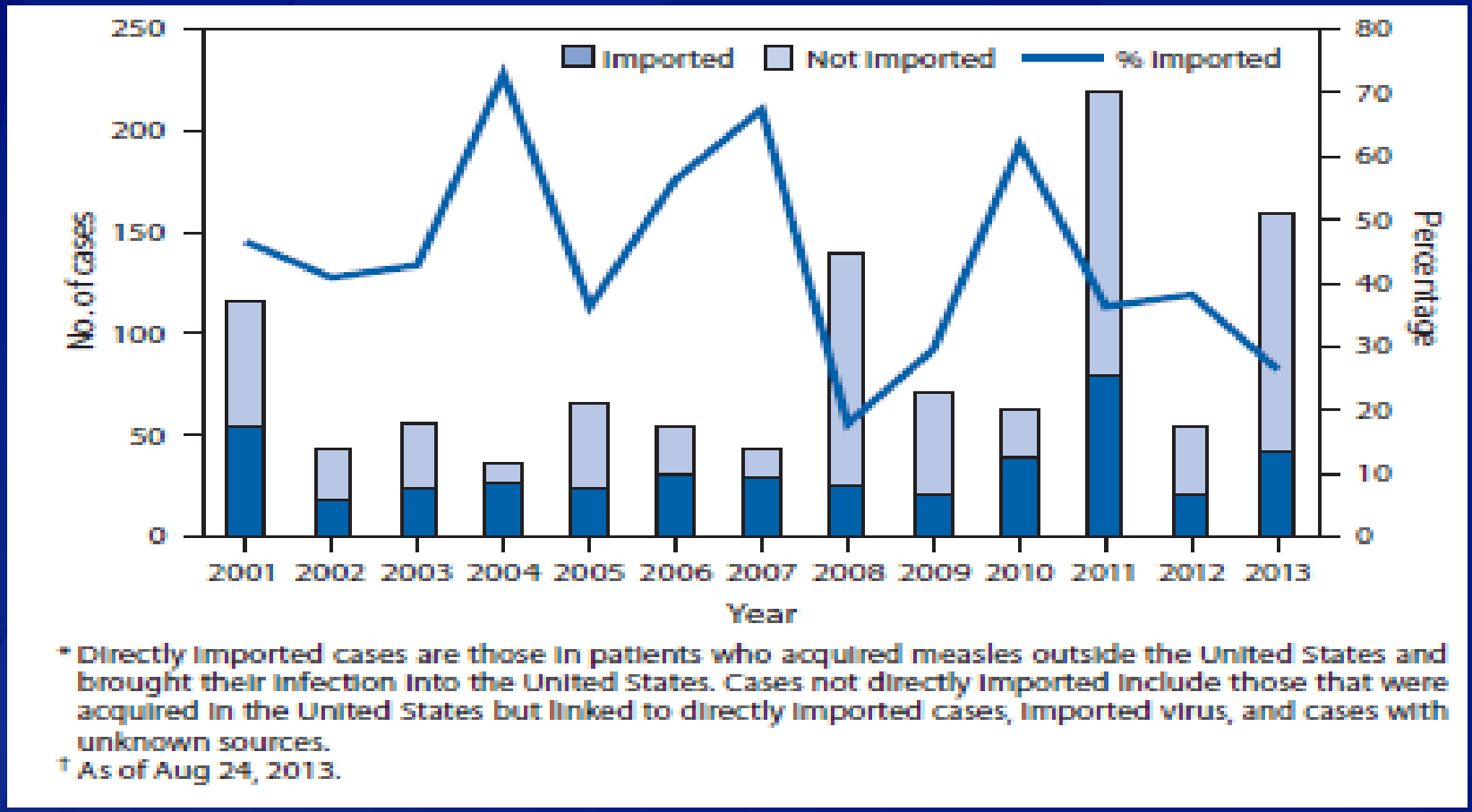
The three measles cases indicated for Montana should instead be indicated for Missouri.

Measles, United States, Jan – Sep 13, 2013
Source of Importations (N=47) -

WHO Region	# of cases	Countries
African	2	Ethiopia (2)
Eastern Mediterranean	8	Pakistan (6), Sudan (1), Turkey (1)
European	23	Germany (6), United Kingdom (4), Poland (4), Italy (2), Azerbaijan (1), Belgium (1), Israel, (1), Republic of Georgia (1), Ukraine (2), Europe (1).
Americas	1	Mexico*
South-East Asia	7	India (3), Indonesia (2), Korea (1), Thailand (1)
Western Pacific	6	China (6)

- Likely acquired disease at a resort frequented by international tourists
- CDC unpublished data

Measles Cases, United States 2001-2013, Percentage of Imported Cases

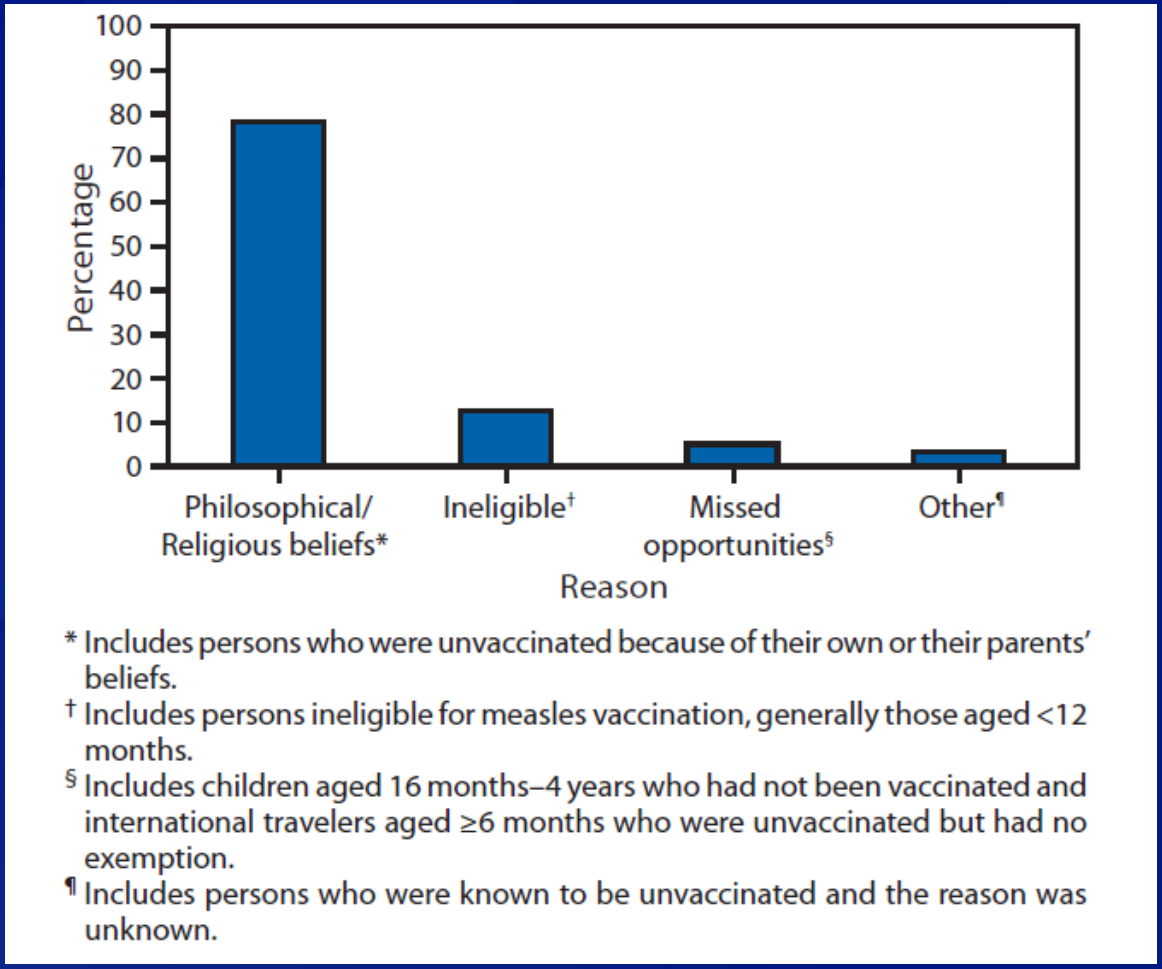


* Directly imported cases are those in patients who acquired measles outside the United States and brought their infection into the United States. Cases not directly imported include those that were acquired in the United States but linked to directly imported cases, imported virus, and cases with unknown sources.

† As of Aug 24, 2013.

http://www.cdc.gov/mmwr/pdf/wk/mm6236.pdf

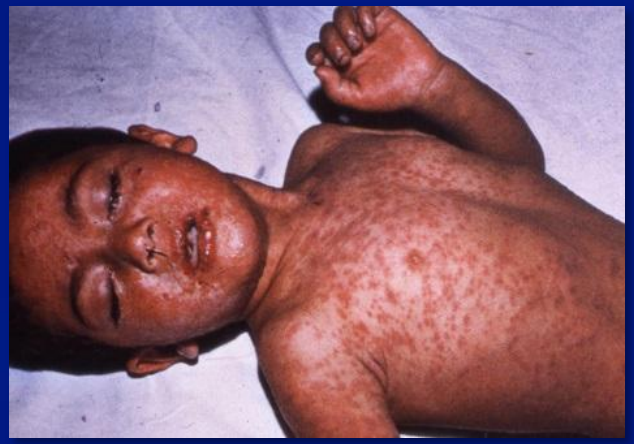
Measles Cases, United States Jan –July 2013, Reasons for Not receiving Measles Vaccine



http://www.cdc.gov/mmwr/pdf/wk/mm6236.pdf

Measles, Mumps, and Rubella Vaccine

- **Acceptable evidence of immunity**
  - removed physician diagnosed disease as an acceptable criterion for evidence of immunity for measles and mumps
  - included laboratory confirmation of disease as a criterion for acceptable evidence of immunity for measles, rubella, and mumps.



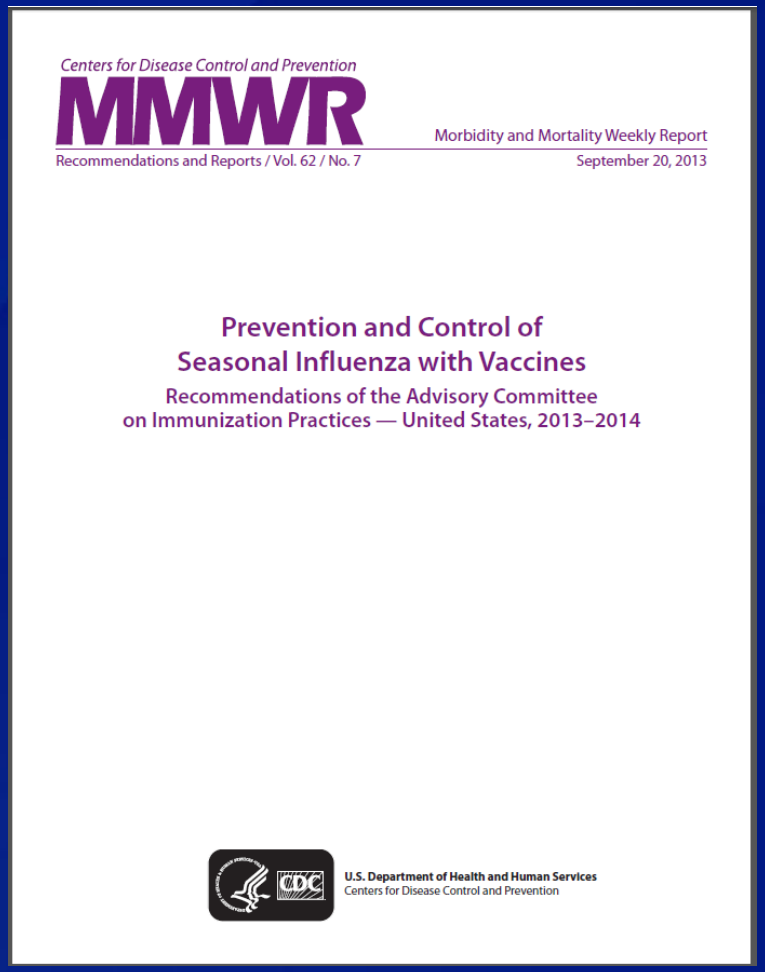
http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm

Measles, Mumps, and Rubella Vaccine

- **Vaccination of HIV infected persons**
  - expanded recommendations for vaccination to all persons aged ≥12 months with HIV infection who do not have evidence of current severe immunosuppression
  - recommended revaccination of persons with perinatal HIV infection who were vaccinated before establishment of effective antiretroviral therapy (ART) with 2 appropriately spaced doses of MMR vaccine once effective ART has been established
  - timing of the 2 doses of MMR vaccine for HIV-infected persons 12 through 15 months and 4 through 6 years of age

http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm

Influenza Vaccines 2013-14



http://www.cdc.gov/mmwr/pdf/rr/rr6207.pdf

Influenza Vaccines for 2013-14

- **Inactivated (IIV3)**
  - Age indications vary by product, formulations and presentations
  - Intramuscular or intradermal injection
  - Trivalent (A/H3N2, A/H1N1, B (Yamagata)
  - Duration of immunity 1 year or less
- **Inactivated (IIV4)**
  - Age indications vary by product and presentations
  - Intramuscular injection
  - Quadrivalent (A/H3N2, A/H1N1, B(Yamagata), B(Victoria)
  - Duration of immunity 1 year or less
- **Live attenuated vaccine (LAIV)**
  - intranasal
  - Quadrivalent (A/H3N2, A/H1N1, B(Yamagata), B(Victoria)
  - Duration of immunity at least 1 year

http://www.cdc.gov/mmwr/pdf/rr/rr6207.pdf

New Influenza Vaccines 2013-14

Product	Indications	Type/ antigens	Presentation	Route
Fluarix	3 yrs and older	IIV4	MF Syringe	IM
FluBlok	18 thru 49 yrs	RIV3	SD Vial	IM
Flucelvax	18 yrs and older	IIV3	MF Syringe	IM
FluMist	2 thru 49 yrs healthy; not pregnant	LAIV4	MF Sprayer	Intranasal
Fluzone	6 months and older	IIV4	MF Syringe SD Vial	IM

Influenza Vaccine Products/Presentations 2013-14

Name	Age Range	# Antigens	Presentation	Route	Type/Abbrev.
Afluria	5 yrs and older	Trivalent	Pre-Filled Syringe Multi-Dose Vial	IM	Inactivated IIV3
Agriflu	18 yrs and older	Trivalent	Pre-Filled Syringe	IM	Inactivated IIV3
Fluarix	3 yrs and older	Trivalent	Pre-Filled Syringe	IM	Inactivated IIV3
		Quadrivalent	Pre-Filled Syringe	IM	Inactivated IIV4
FluBlok	18 yrs thru 49 yrs	Trivalent	Single-Dose Vial	IM	Recombinant RIV3
Flucelvax	18 yrs and older	Trivalent	Pre-Filled Syringe	IM	Cell Culture IIV3
FluLaval	18 yrs and older	Trivalent	Multi-Dose Vial	IM	Inactivated IIV3
FluMist	2 yrs thru 49 yrs	Quadrivalent	Pre-Filled Sprayer	Intranasal	Live Attenuated LAIV4
Fluvirin	4 yrs and older	Trivalent	Pre-Filled Syringe Multi-dose Vial	IM	Inactivated IIV3
Fluzone	6 months and older	Trivalent	Pre-Filled Syringe Single-Dose Vial Multi-Dose Vial	IM	Inactivated IIV3
		Quadrivalent	Pre-Filled Syringe Single-Dose Vial	IM	Inactivated IIV4
Fluzone High-Dose	65 yrs and older	Trivalent	Pre-Filled Syringe	IM	Inactivated IIV3
Fluzone Intradermal	18 yrs thru 64 yrs	Trivalent	Pre-Filled Microinjection System	Intradermal (ID)	Inactivated IIV3

Choice of Influenza Vaccine

- The choice should primarily be driven by the age-indication and contraindications and precautions
- Where more than one type of vaccine is appropriate and available, ACIP has no preferential recommendation for use of any influenza vaccine product over another
  - Quadrivalent vs trivalent
  - High-dose vs standard dose
  - IIV vs LAIV in any age group for whom either is indicated

http://www.cdc.gov/mmwr/pdf/rr/rr6207.pdf

Influenza Vaccination Schedule

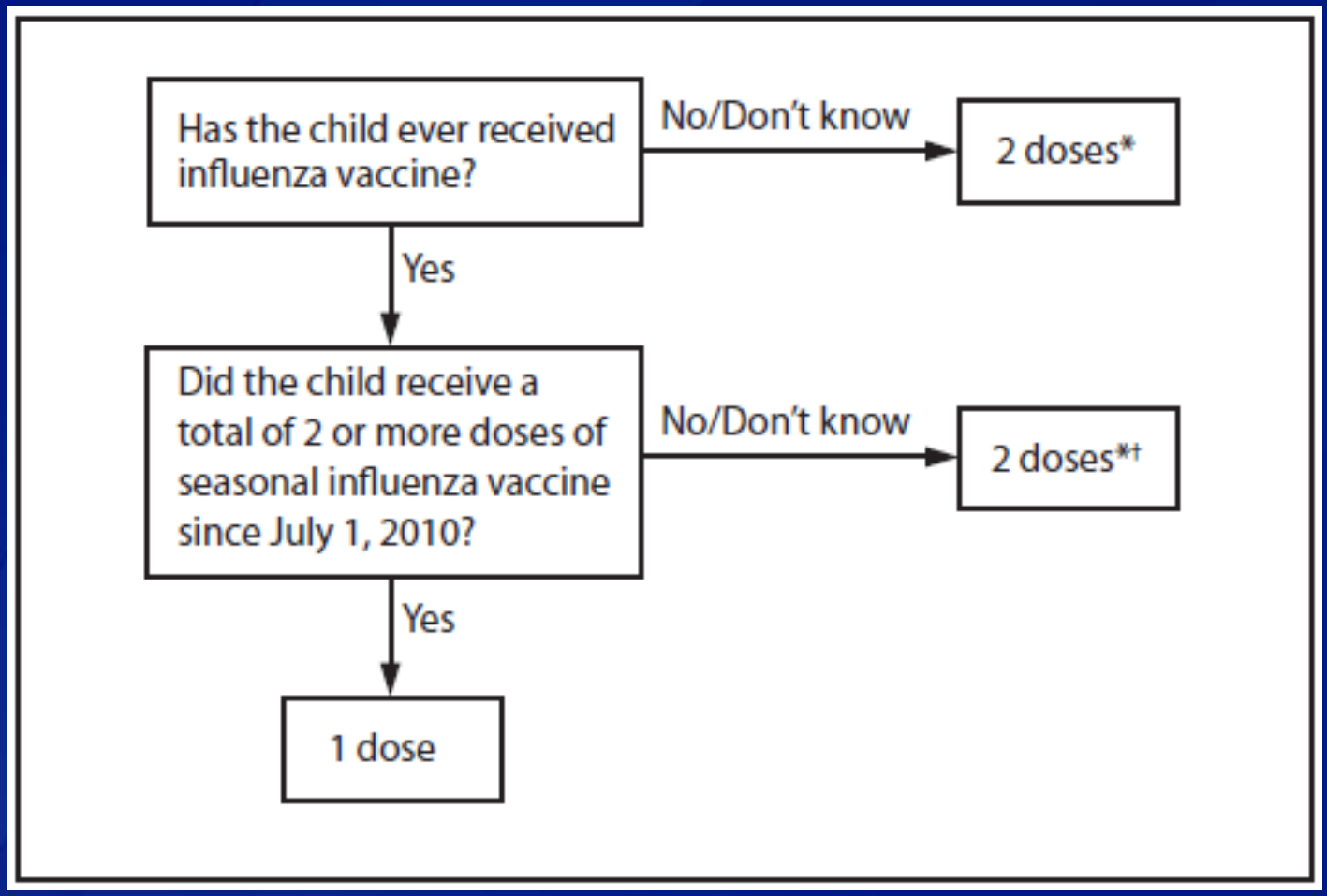
- Annual vaccination for persons 6 months of age and older without contraindications or precautions
- IIV dosage varies by age
  - 6 months through 35 months 0.25 ml
  - 3 years and older 0.5 mL
- Administer 1 dose per season to persons 9 years of age and older
- Some children 6 months through 8 years of age will need 2 doses

One Dose or Two?
Vaccine for Children 6 Months Through 8 Years

- Children aged 6 months through 8 years require 2 doses in the first season they are vaccinated
- If previously vaccinated, need to have received 2009(H1N1)-containing vaccine (2009 monovalent, or 2010-11, 2011-12, or 2012-13 seasonal vaccines)
- This season (as the last), there are two acceptable approaches for determining the number of doses
- These differ in whether or not vaccination history prior to the 2010-2011 season is considered

//www.cdc.gov/mmwr/pdf/rr/rr6207.pdf

Dose Algorithm for 6 Months Through 8 Year Olds



* Doses should be administered a minimum of 4 weeks apart.

://www.cdc.gov/mmwr/pdf/rr/rr6207.pdf

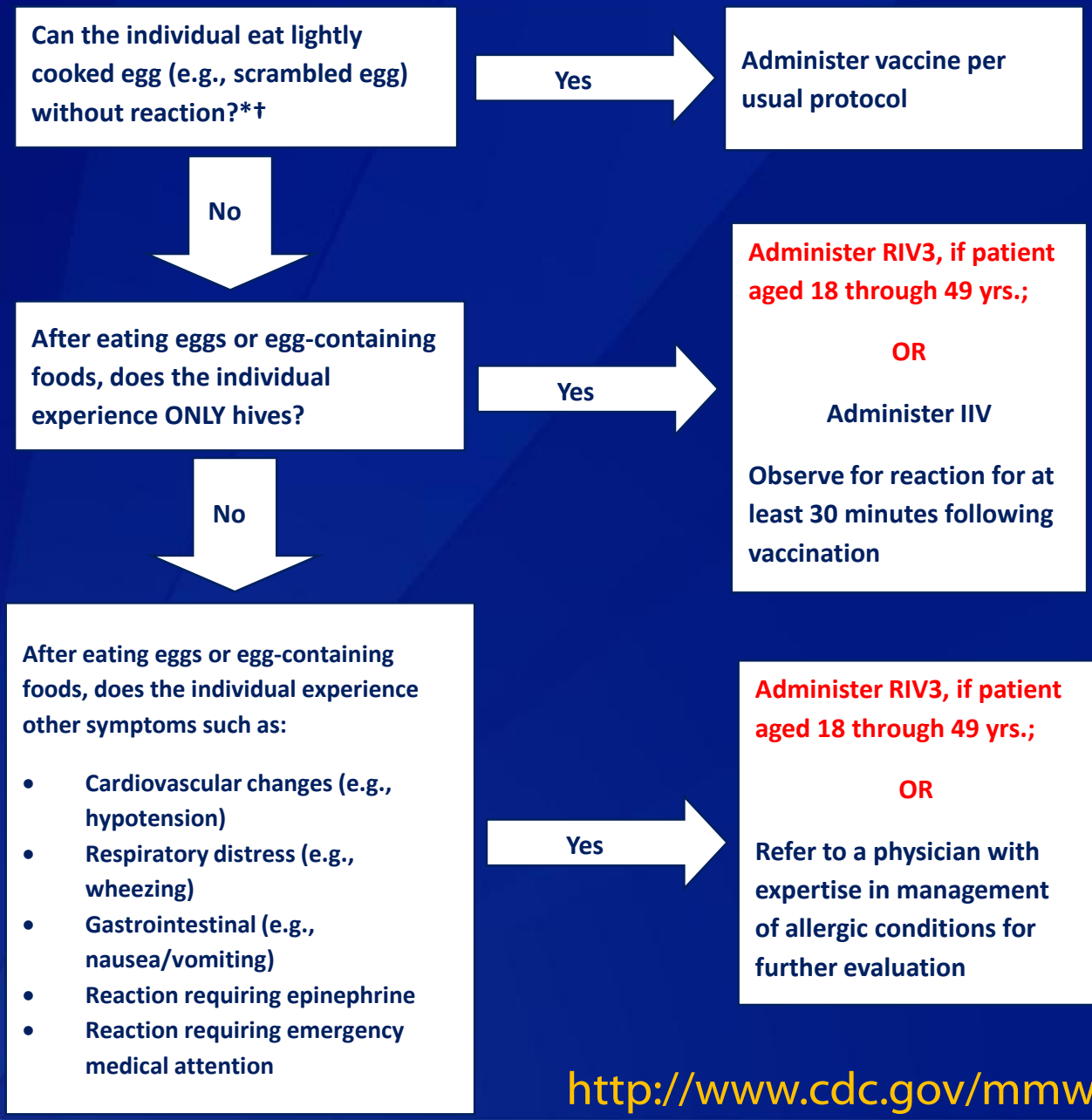
Dose Algorithm for 6 Months Through 8 year olds, 2013-2014 season—Alternative Approach

- If vaccination history before 2010–11 is available
- If child received
  - 2 or more seasonal influenza vaccines during any previous season,
  - And at least 1 dose of a 2009(H1N1)-containing vaccine (monovalent 2009(H1N1) or 2010-11, 2011-12 or 2012-13 seasonal vaccine),
  - Then the child needs only 1 dose in 2013–14

- Need only 1 dose of vaccine in 2013–14 if :
  - ≥2 doses of seasonal influenza vaccine since July 1, 2010; or
  - ≥2 of seasonal influenza vaccine before July 1, 2010, and ≥1 dose of monovalent 2009(H1N1) vaccine; or
  - ≥1 dose of seasonal influenza vaccine before July 1, 2010, and ≥1 dose of seasonal influenza vaccine since July 1, 2010.

http://www.cdc.gov/mmwr/pdf/rr/rr6207.pdf

Influenza Vaccination for Persons with Egg Allergies—2013-14



http://www.cdc.gov/mmwr/pdf/rr/rr6207.pdf

Influenza Vaccination for Persons with Egg Allergies—2013-14: Second Modification

Addition of the following:

- For individuals with no known history of exposure to egg, but who are suspected of being egg-allergic on the basis of previously performed allergy testing:
  - Consultation with a physician with expertise in the management of allergic conditions should be obtained prior to vaccination
  - Alternatively, RIV3 may be administered if the recipient is 18 through 49 years of age

http://www.cdc.gov/mmwr/pdf/rr/rr6207.pdf

What would you do?

- An 8-year-old boy received influenza vaccine for the first time this flu season.

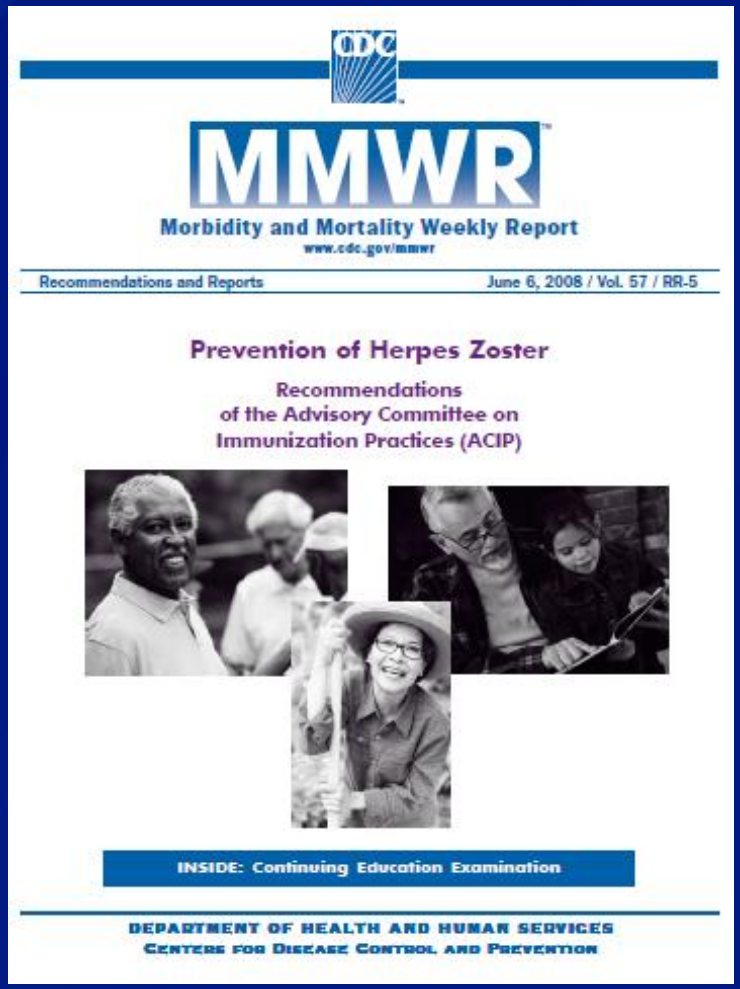
  When he returns for the second dose, he is 9 years old.

  Do you administer the dose?

- Yes
- No

No. Persons 9 years of age and older only need 1 dose each flu season. He has "aged out" of the recommendation for a 2nd dose.

Zoster Vaccine



http://www.cdc.gov/mmwr/PDF/rr/rr5705.pdf

Zoster Vaccine

- Now licensed for adults 50-59 years of age
- Routine vaccination of adults younger than 60 years NOT recommended by ACIP
- Rationale
  - reduced supply
  - burden of complications highest in persons older than 60 years

ACIP Recommendations for Zoster Vaccine

- Adults 60 years and older should receive a single dose of zoster vaccine
- Need for booster dose or doses not known at this time
- A history of herpes zoster should not influence the decision to vaccinate

MMWR 2008;57(RR-5)

Zoster Vaccine

- It is not necessary to inquire about chickenpox or test for varicella immunity before administering zoster vaccine
- Persons 60 years of age and older can be assumed to be immune* regardless of their recollection of chickenpox

MMWR 2008;57(RR-5)

*for the purpose of establishing eligibility for zoster vaccine

any vaccine. For information or a copy of the vaccine reporting form, call the VAERS toll-free number at 1-800-822-7967 or report online to www.vaers.hhs.gov.[2]

7 DRUG INTERACTIONS

7.1 Concomitant Administration with Other Vaccines

In a randomized clinical study, a reduced immune response to ZOSTAVAX as measured by gpELISA was observed in individuals who received concurrent administration of PNEUMOVAX® 23 and ZOSTAVAX compared with individuals who received these vaccines 4 weeks apart. Consider administration of the two vaccines separated by at least 4 weeks *[see Clinical Studies (14.3)]*.

For concomitant administration of ZOSTAVAX with trivalent inactivated influenza vaccine, *[see Clinical Studies (14.3)]*.

7.2 Antiviral Medications

Concurrent administration of ZOSTAVAX and antiviral medications known to be effective against VZV has not been evaluated.

8 USE IN SPECIFIC POPULATIONS

8.1 Pregnancy

Pregnancy Category: Contraindication *[see Contraindications (4.3)]*

Zostavax product information, June 2011

Zoster and PPSV Vaccines

- CDC has not changed its recommendation for either vaccine
- Zoster and PPSV should be administered at the same visit if the person is eligible for both vaccines

Zoster Vaccine Contraindications

- Severe allergic reaction to a vaccine component or following a prior dose
- Pregnancy or planned pregnancy within 4 weeks
- Immunosuppression

MMWR 2008;57(RR-5)

Zoster Vaccine Contraindications Immunosuppression

- **Leukemia, lymphoma or other malignant neoplasm affecting the bone marrow or lymphatic system**
  - persons whose leukemia or lymphoma is in remission and who have not received chemotherapy or radiation for at least 3 months can be vaccinated
- **AIDS or other clinical manifestation of HIV infection**
  - includes persons with CD4+ T-lymphocyte values less than 200 per mm^3, or less than 15% of total lymphocytes

Zoster Vaccine Contraindications Immunosuppression

- **High-dose corticosteroid therapy**
  - 20 milligrams or more per day of prednisone or equivalent lasting 2 or more weeks
  - Vaccination should be deferred for at least 1 month after discontinuation of therapy

MMWR 2008;57(RR-5)

Zoster Vaccine Contraindications Immunosuppression

- **Hematopoietic cell transplant recipients**
  - experience is limited
  - assess the immune status of the recipient on a case-by-case basis
  - if a decision is made to vaccinate, the vaccine should be administered at least 24 months after transplantation

MMWR 2008;57(RR-5)

Zoster Vaccine Contraindications Immunosuppression

- Recombinant human immune mediators and immune modulators
- Preferable to administer zoster vaccine before treatment
- Assess the immune status of the recipient on a case-by-case basis
- Vaccination should be deferred for at least 1 month after discontinuation of treatment

MMWR 2008;57(RR-5)

Zoster Vaccine Precautions

- **Moderate or severe acute illness**
- **Current treatment with an antiviral drug active against herpes viruses**
  - discontinue at least 24 hours before administration of zoster vaccine
  - should not be taken for at least 14 days after vaccination
- **Recent receipt of a blood product is NOT a precaution**

MMWR 2008;57(RR-5)

What would you do?

- What is the minimum interval between a dose of varicella vaccine and a dose of zoster vaccine?

None.
Zoster vaccination is not recommended for persons of any age who have received varicella vaccine.

VACCINE COMMUNICATION CHALLENGES

It's not about parents or patients saying "I have some concerns about vaccines" and that is the end of the conservation.

That is just the start.

How to Have a Successful Dialogue with Parents

- Keep the conversation going
- Take time to welcome questions
- Balance science with anecdotal information
- Acknowledge benefits and risks

How to Have a Successful Dialogue with Parents

- Respect parents' authority
- Reduce the stress of shots
- Document parents' questions and concerns
- Follow up
- Don't give up- strongly recommend vaccines

What's in a Recommendation?

Studies consistently show that a strong recommendation from you is the single best predictor of vaccination

Focus group surveys reinforce that when a mom had a doctor recommend or not recommend vaccines it was an important factor in their decision to vaccinate their child

HPV and A Strong Recommendation

You: Meghan is due for some shots today: HPV, meningococcal vaccine, and Tdap.

Parent: Why does she need an HPV vaccine? She's only 11!

You: HPV vaccine will help protect Meghan from cancer caused by HPV infection. And I want to make sure Meghan receives all 3 doses and develops protection long before she becomes sexually active.

Parent: But it just seems so young…

You: We don't wait until exposure occurs to give any other routinely recommended vaccine. HPV vaccine is also given when kids are 11 or 12 years old because it produces a better immune response at that age. That's why it is so important to start the shots now and finish them in the next 6 months.

Institute of Medicine Report: The Childhood Immunization Schedule and Safety

REPORT BRIEF JANUARY 2013

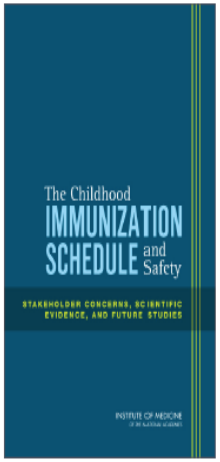
INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

Advising the nation • Improving health

For more information visit www.iom.edu/childimmunizationschedule

The Childhood Immunization Schedule and Safety

Stakeholder Concerns, Scientific Evidence, and Future Studies



Upon reviewing stakeholder concerns and scientific literature regarding the entire childhood immunization schedule, the IOM committee finds no evidence that the schedule is unsafe

http://www.cdc.gov/vaccinesafety/Concerns/childhood_immunization_iomstudies.html

CDC Home

Centers for Disease Control and Prevention

CDC 24/7: Saving Lives. Protecting People.™

SEARCH

A-Z Index A B C D E F G H I J K L M N O P Q R S T U V W X Y Z #

Vaccine Safety

Monitoring health problems after vaccination is essential to ensure the United States continues to have the safest, most effective vaccine supply in history. CDC's Immunization Safety Office identifies possible vaccine side effects and conducts studies to determine whether a health problem is caused by a specific vaccine.

Email page link

Print page

Get email updates

To receive email updates about this page, enter your email address:

What's this? Submit

About Vaccine Safety

Vaccines Safety Basics
Vaccines: Hib, HPV, MMR, MMRV, Rotavirus...

Addressing Common Concerns
Autism, GBS, SIDS, Fainting (Syncope), MS, Thimerosal, FAQs...

How Vaccines are Monitored
How Vaccines are Tested, Vaccine Monitoring Activities in the U.S. and Common Questions, etc...

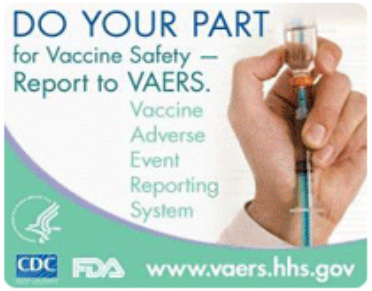
Activities
About CISA Network, Emergency Preparedness, VAERS, VAU, VSD...

Special Populations
Information for Healthcare Providers, Parents, Researchers...

Resource Library
Articles, Fact Sheets, FAQs, Research...

Quick Links

- FDA News: Rotarix Label Update
- VSD study on RV5 vaccine
- ISO Scientific Agenda
- Seasonal Influenza
- Immunization Schedules
- Traveler's Health/International
- CDC en Español: Immunización



Contact Us:

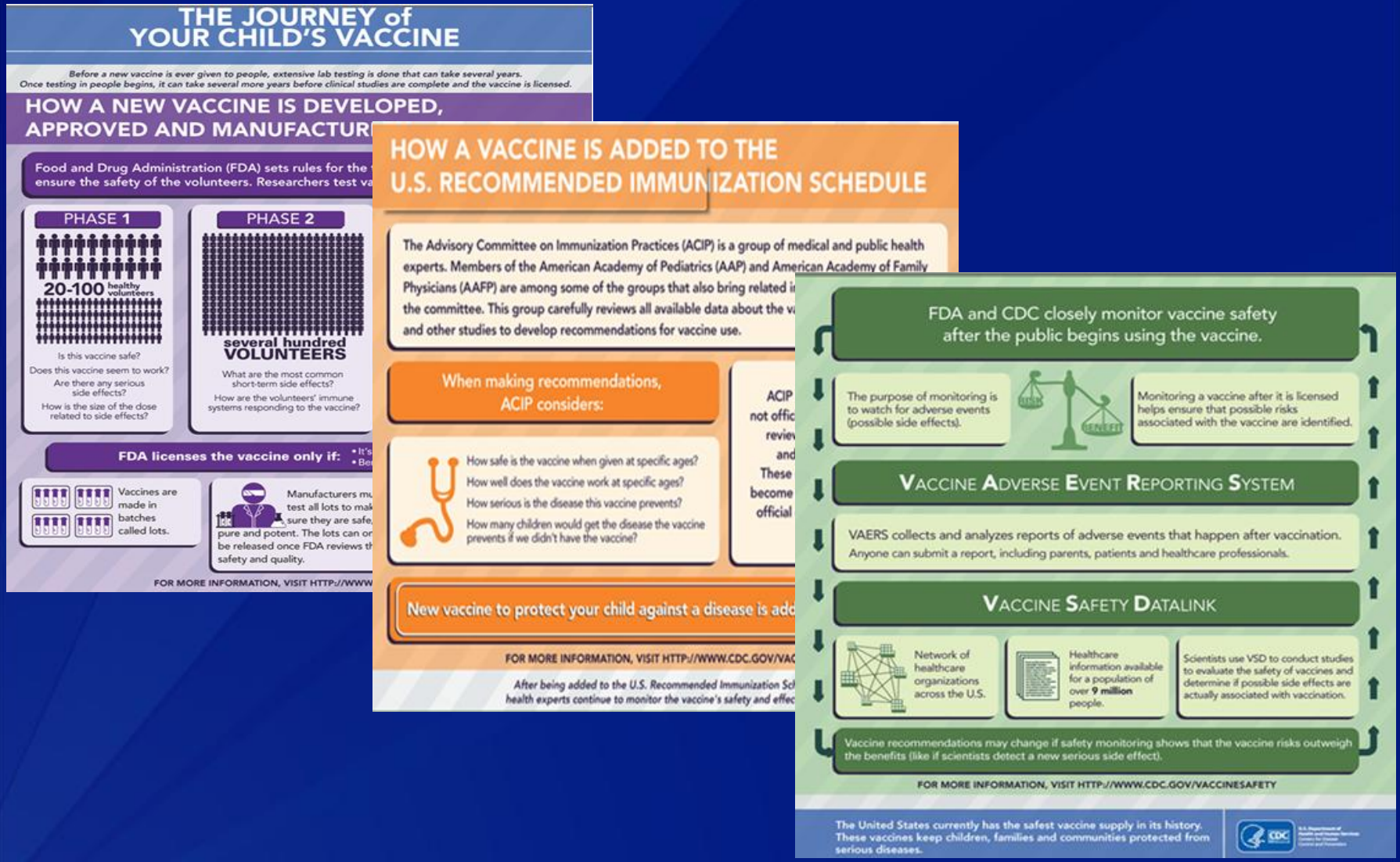
Centers for Disease Control and Prevention
1600 Clifton Rd
Atlanta, GA 30333

800-CDC-INFO
(800-232-4636)
TTY: (888) 232-6348

Contact CDC–INFO

http://www.cdc.gov/vaccinesafety/index.html

The Journey of Your Child's Vaccine - Infographic

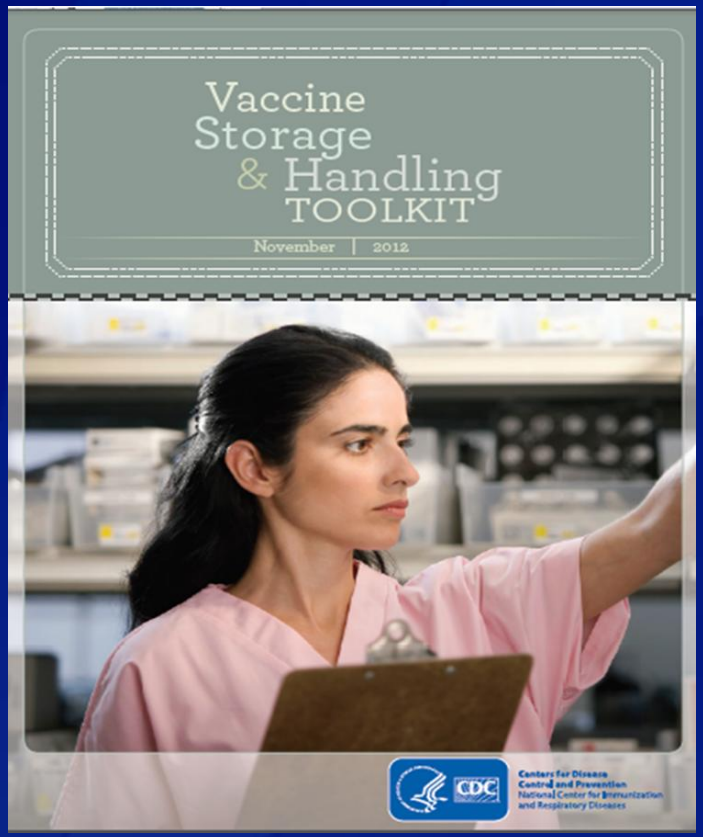


http://www.cdc.gov/vaccines/parents/infographics/journey-of-child-vaccine.html

Adult Immunization Key Messages

- Vaccines are recommended throughout the lifespan
- Number of vaccines are increasing to protect adults from infectious diseases and their long-term consequences
- Hep. B and HPV vaccine can prevent cancer
- Vaccinating adults also protects others who are more vulnerable

http://www.cdc.gov/vaccines/adults/index.html



VACCINE STORAGE AND HANDLING

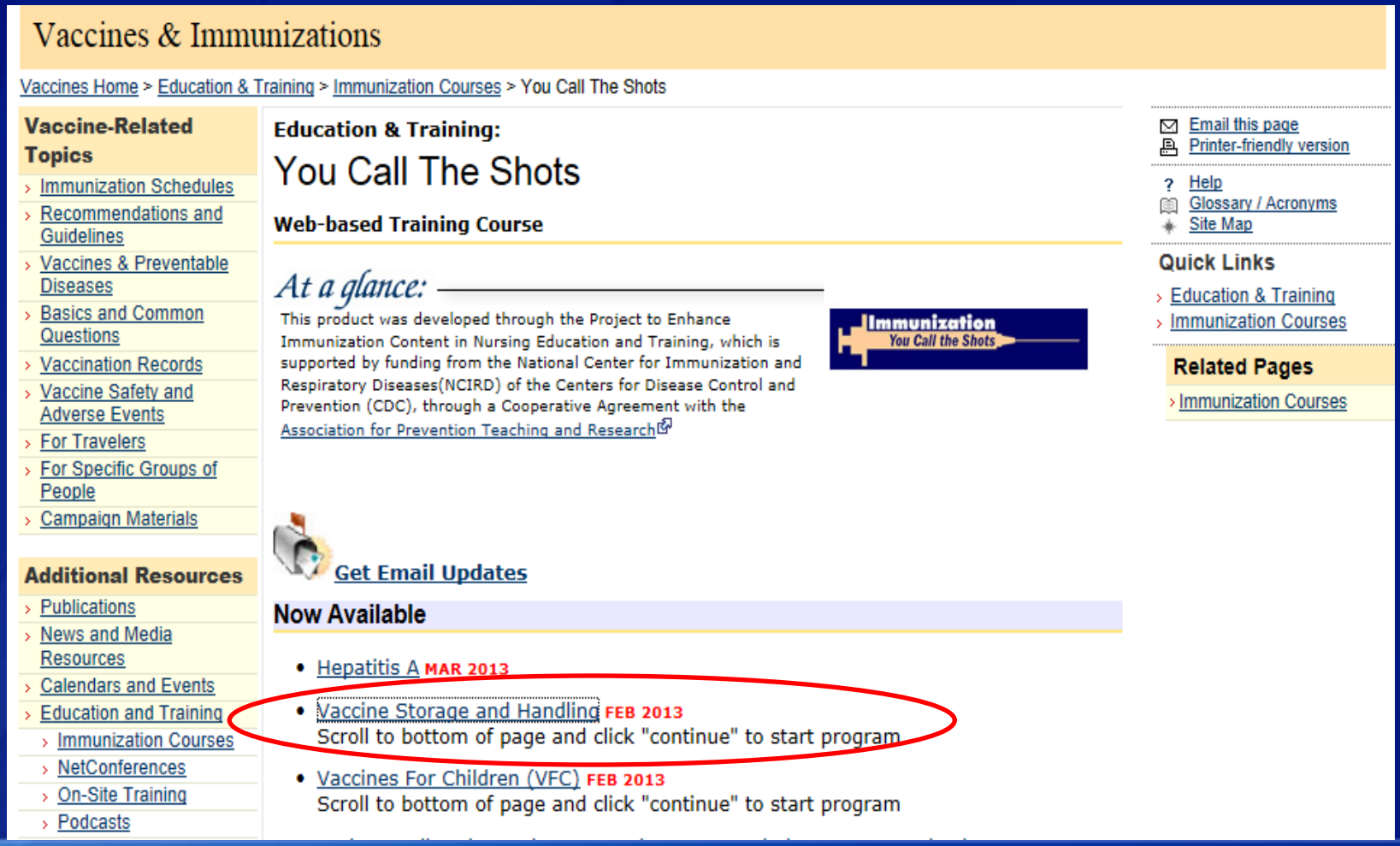
http://www.cdc.gov/vaccines/recs/storage/default.htm

Vaccine Storage & Handling Best Practices

- CDC Recommendations
  - Stand-alone refrigerators and freezers
  - Digital data logger thermometers with temperature probe in thermal buffer, e.g. glycol that have a certificate of calibration
  - Read and document temperatures twice daily and minimum/maximum temperatures once daily
  - Rotate stock and immediately remove expired vaccines and diluents
  - Do not use dormitory-style units for vaccine storage, even temporarily
  - Take immediate corrective action in the event of a temperature excursion

Vaccine Storage & Handling Web-Based Training Continuing Education Offered

http://www.cdc.gov/vaccines/ed/youcalltheshots.htm



VACCINE ADMINISTRATION

Vaccine Administration Best Practices

- Assess the immunization record
- Use the current recommended immunization schedules
- Screen for contraindications and precautions
- Educate the parent and/or patient, using Vaccine Information Statements and other credible resources

Vaccine Administration Best Practices

- Prepare the vaccine just prior to administration
- Administer vaccine(s) using best practice guidelines, the rights of medication administration, and measures to minimize discomfort and promote safety
- Implement protocols to manage an acute adverse reaction should it occur
- Document vaccine
- Provide the patient with a copy of their immunization record

Reducing Injection Pain

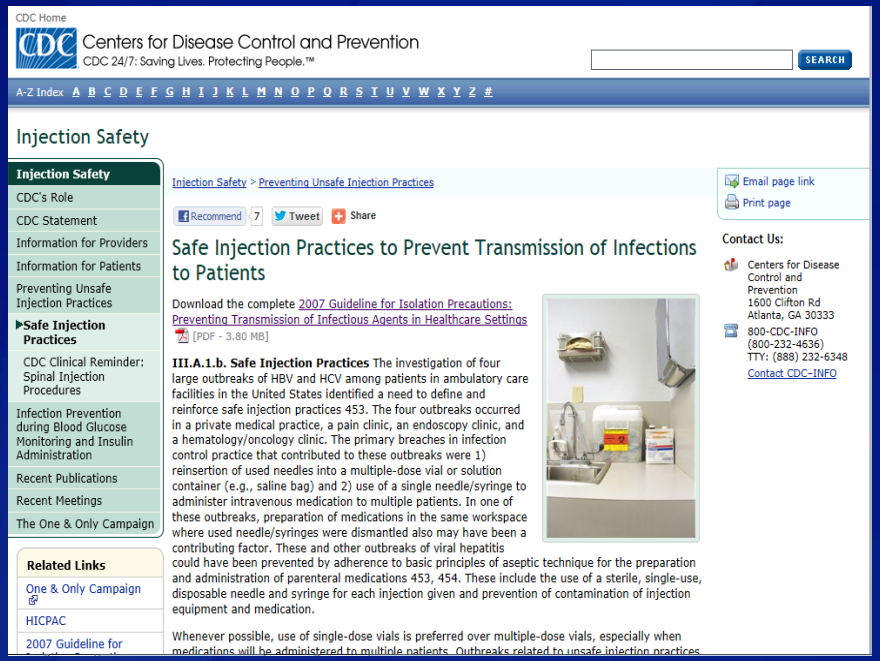
1. Swaddling
2. Side/stomach position
3. Shushing
4. Swinging
5. Sucking

http://www.youtube.com/watch?v=O0Hlu9wPMjM&feature=player_detailpage

http://www.youtube.com/watch?v=WkR_e1L6zxI&feature=player_detailpage

John W. Harrington, MD, Stacey Logan, MD, Courtney Harwell, MD, Jessica Gardner, MD, Jessica Swingle, BS, Erin McGuire, MSa, and Rosemarie Santos, MD *Pediatrics* April 16th, 2012. doi: 10.1542/peds.2011-1607

CDC Safe Injection Practices



http://www.cdc.gov/injectionsafety/IP07_standardPrecaution.html

NCIRD Vaccine Administration

http://www.cdc.gov/vaccines/recs/vac-admin/default.htm

Knowledgeable Staff is Key

- **All staff (permanent and temporary) who handle and administer vaccines should receive comprehensive training**
  - Recommendations updates
  - New staff orientation
- **Challenge**
  - Train prior to staff administer their first dose of vaccine

Vaccines & Immunizations

Vaccine-Related Topics
- Immunization Schedules
- Recommendations and Guidelines
- Vaccines & Preventable Diseases
- Basics and Common Questions
- Vaccination Records
- Vaccine Safety and Adverse Events
- For Travelers
- For Specific Groups of People
- Campaign Materials

Additional Resources
- Publications
  - Vaccine Information Statements (VIS)
  - Textbooks, Manuals and Guidelines
  - Flyers and Brochures
  - Posters
  - Videos, Broadcasts, Webcasts, PSAs and Podcasts
  - Recommendations and Reports
  - More Sources of Publications
- News and Media Resources
- Calendars and Events
- Education and Training
- Programs and Tools
- Statistics and Surveillance
- Partners' & Related Sites
- About NCIRD

Publications:

Vaccine Information Statements

At a glance:

Vaccine Information Statements (VISs) are information sheets produced by the Centers for Disease Control and Prevention (CDC) that explain to vaccine recipients, their parents, or their legal representatives both
handed out whenev

Downloadable VI
| Multiple Vaccines

| Adenovirus | An
| JE UPDATED | MMR
UPDATED | Rabies |
| Varicella | Yellov

| **VIS News** Inf

| Mandatory Instru
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Downloadable VISs

Multiple Vaccines (9/18/08)

! This VIS may be used as an optional substitute for any or all of the routine birth-6 month vaccine VISs. (DTaP, IPV, Hib, PCV, Hepatitis B, and Rotavirus) See VIS News.

- Multiple Vaccines [PDF-105KB]
- FAQs
- Other languages* (including Spanish)

CDC Vaccines and Immunization Contact Information

- Telephone — www.cdc.gov/info
  (for patients and parents)
- Email — nipinfo@cdc.gov
  (for providers)
- Website — www.cdc.gov/vaccines/
- Vaccine Safety — ww.cdc.gov/vaccinesafety/

Act as if what you do makes a difference.
It does.

William James